actron

CP9180

AutoScanner® Plus

P/N 0002-000-2935

Tool Information

Complete the following list.
Provide this information when
contacting customer support.

Serial No: _____

SW ID: _____

Refer to section 3-7 to get the Serial Number (Serial No) and Software Identification (SW ID.)

If you have questions or concerns Contact
Technical Support:

- **Phone:** 1-800-228-7667
- **Website:** www.actron.com
- **Mail:** SPX Service Solutions
  15825 Industrial Parkway
  Cleveland, Ohio 44135
  Attn: Technical Support

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Safety Precautions

For your safety, read this manual thoroughly before operating your Scan Tool. Always refer to and follow safety messages and test procedures provided by the manufacturer of the vehicle or equipment being tested.

The safety messages presented below and throughout this user's manual are reminders to the operator to exercise extreme care when using this test instrument.

Read All Instructions

Read, understand and follow all safety messages and instructions in this manual and on the test equipment. Safety messages in this section of the manual contain a signal word with a three-part message and, in some instances, an icon.

Safety Messages

Safety messages are provided to help prevent personal injury and equipment damage. All safety messages are introduced by a signal word. The signal word indicates the level of the hazard in a situation. The types of safety messages are.

⚠DANGER	**Indicates a possible hazardous situation which, if not avoided, will result in death or serious injury to operator or bystanders.**
⚠WARNING	**Indicates a possible hazardous situation which, if not avoided, could result in death or serious injury to operator or bystanders.**
⚠CAUTION	**Indicates a possible hazardous situation which, if not avoided, may result in moderate or minor injury to operator or bystanders.**
IMPORTANT	**Indicates a condition which, if not avoided, may result in damage to test equipment or vehicle.**

Type Styles Used:

Safety messages contain three different type styles.

- Normal type states the hazard.
- **Bold** type states how to avoid the hazard.
- *Italic* type states the possible consequences of not avoiding the hazard.

Icons used:

An icon, when present, gives a graphical description of a potential hazard.

Example:

Engine systems can malfunction expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

Safety goggles and protective gloves must be worn by the operator and any bystanders. Even if everyday eyeglasses have impact resistant lenses, they are NOT safety glasses.

Engine systems that malfunction can cause injury.

Important Safety Messages

Risk of electric shock.

- **Do not exceed voltage limits between inputs indicated in the Specifications.**
- **Use extreme caution when working with circuits that have voltage greater than 60 volts DC or 24 volts AC.**

Electric shock can cause injury.

Risk of explosion.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.
- **Do not use this scan tool in environments where explosive vapors may collect. These areas include:**
  - below-ground pits.
  - confined areas.
  - areas that are less than 18 inches above floor.
- **Use this Scan Tool in locations with mechanical ventilation providing at least 4 air changes per hour.**
- **Flammable fuel and vapors can ignite.**
- **Do not smoke, strike a match, or cause a spark in the vicinity of the battery. Battery gases can ignite.**

- **Avoid making an accidental connection between the battery terminals. Do not place uninsulated metal tools on the battery.**
- **When removing battery cables, remove the ground cable first.**
- **Avoid sparks when connecting or disconnecting power leads to the battery.**
- **Make sure ignition is off, headlights and other accessories are off and vehicle doors are closed before disconnecting the battery cables.**
  - This also helps prevent damage to on-board computer systems.
- **Always disconnect the battery ground connections before servicing electrical system components.**

Explosion can cause injury.

Risk of poisoning.

- **Use this Scan Tool in locations with mechanical ventilation providing at least 4 air changes per hour. Engine exhaust contains odorless gas which can be lethal.**
- **Route the exhaust outside while testing with the engine running.**

Poisoning can result in death or serious injury.

Battery acid is a highly corrosive sulfuric acid.

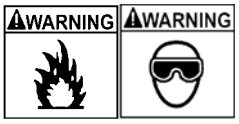
- **Safety goggles and protective gloves must be worn by the operator and any bystanders.**
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

- **Make sure someone can hear you or is close enough to provide aid when working near a battery.**

- **Have plenty of fresh water and soap nearby.**
  - If battery acid contacts skin, clothing, or eyes, flush exposed area with soap and water for 10 minutes. Seek medical help.

- **Do not touch eyes while working near battery.**

Battery acid can burn eyes and skin.



Risk of fire.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

- **Do not position your head directly in front of or over the throttle body.**

- **Do not pour gasoline down the throttle body when cranking or running the engine, when working with fuel delivery systems or any open fuel line.**
  - Engine backfire can occur when the air cleaner is out of position.

- **Do not use fuel injector cleaning solvents when performing diagnostic testing.**

- **Keep cigarettes, sparks, open flame and other sources of ignition away from vehicle.**

- **Keep a dry chemical (Class B) fire extinguisher rated for gasoline, chemical and electrical fires in work area.**

Fire can cause death or serious injury.

Risk of flying particles.

- **Safety goggles and protective gloves must be worn by the operator and any bystanders while using electrical equipment.**
  - Electrical equipment or rotating engine parts can cause flying particles.
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

Flying particles can cause eye injury.

Risk of burns.

- **Batteries can produce a short-circuit current high enough to weld jewelry to metal.**
  - Remove jewelry such as rings, bracelets and watches before working near batteries.

Short circuits can cause injury.

Risk of burns.

- **Do not remove radiator cap unless engine is cold.**
  - Pressurized engine coolant may be hot.
- **Do not touch hot exhaust systems, manifolds, engines, radiators, sample probe.**
- **Wear insulated gloves when handling hot engine components.**
- **Tester leads can become hot after extended testing in close proximity to manifolds.**

Hot components can cause injury.

Risk of expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.
- **Engine systems can malfunction, expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.**

Fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris can cause serious injury.

Engine compartment contains electrical connections and hot or moving parts.

- **Keep yourself, test leads, clothing and other objects clear of electrical connections and hot or moving engine parts.**
- **Do not wear watches, rings, or loose fitting clothing when working in an engine compartment.**
- **Do not place tools or test equipment on fenders or other places in engine compartment.**
- **Barriers are recommended to help identify danger zones in test area.**
- **Prevent personnel from walking through test area.**

Contacting electrical connections and hot or moving parts can cause injury.

Risk of injury.

- **The Scan Tool should be operated by qualified personnel only.**
- **Use the scan tool only as described in the user's manual.**
- **Use only manufacturer's recommended attachments.**
- **Do not operate the Scan Tool with damaged cables.**
- **Do not operate the Scan Tool if it has been dropped or damaged, until examined by a qualified service representative.**

Operation of the Scan Tool by anyone other than qualified personnel may result in injury.

⚠WARNING

Risk of unexpected vehicle movement.

- **Block drive wheels before performing a test with engine running.**

- **Unless instructed otherwise:**
  - set parking brake
  - put gear selector in neutral for manual transmissions
  - put gear selector in park for automatic transmissions
  - disconnect release mechanism on the automatic parking brake release for testing and reconnect when testing is completed.

- **Do not leave a running engine unattended.**

A moving vehicle can cause injury.

⚠CAUTION

Risk of equipment or circuit damage.

- **Unless specifically directed by manufacturer, make sure ignition is off before connecting or disconnecting connectors or any vehicle electrical terminals.**

- **Do not create a short between battery terminals with a jumper wire or tools.**

Improper equipment use can cause equipment or circuit damage.

⚠CAUTION

Misdiagnosis may lead to incorrect or improper repair and/or adjustment.

- **Do not rely on erratic, questionable, or obviously erroneous test information or results.**
  - If test information or results are erratic, questionable, or obviously erroneous, make sure all connections and data entry information are correct and test procedures were performed correctly.
  - If test information or results are still suspicious, do not use them for diagnosis.

Improper repair and/or adjustment may cause vehicle or equipment damage or unsafe operation.

⚠DANGER

Some vehicles are equipped with air bags.

- **Follow service manual warnings when working around air bag components or wiring.**
  - If service manual instructions are not followed, an air bag may deploy unexpectedly, resulting in injury.
  - Note an air bag can still deploy several minutes after ignition key is off (or even if vehicle battery is disconnected) because of a special energy reserve module.

An air bag opening can cause injury.

Section 1 – Using This Manual

This manual contains instructions for the use and setup of your Scan Tool. A table of contents and glossary are provided to make this manual easy to use.

Some of the information shown in text or illustrations is obtained using optional equipment. A Sales Representative can determine option availability.

This section contains a list of conventions used.

Safety Messages

Refer to ***Safety Precautions*** on page Safety - i.

Check Note

A check note provides additional information about the subject in the preceding paragraph.

Example:

✓ English is the default measurement unit.

Equipment Tips and Lists

Equipment tips and lists provide information that applies to specific equipment. Each tip is introduced by this icon ❒ for easy identification.

Example:

❒ Observe all vehicle and/or equipment manufacturer's cautions and warnings when testing with the Scan Tool.

Equipment Damage

Situations arise during testing that could damage the vehicle or the test equipment. The word **IMPORTANT** signals these situations.

Example:

IMPORTANT Failure to follow these instructions could damage the Scan Tool.

Functions and Selections

Diagnostic and tool functions performed by the Scan Tool are highlighted in **bold**.

Example:

The **View Data** function allows you to view the vehicle's parameter identification (PID) data in real time.

Menus

The menus on the Scan Tool display are referenced in the procedures and are highlighted in ***bold-italic*** text.

Example:

When the ***OBDII Function List*** menu displays, the Scan Tool is ready for use.

Questions and Responses

Messages and user responses are CAPITALIZED.

Example:

The Scan Tool displays the pending DTCs or a message stating ***SYSTEM PASS: NO FAULT DETECTED***.

Manual References

Used to reference other sections of the manual. References include the **Title** and page number (section-page).

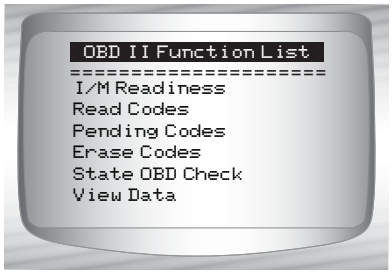
Example:

For more information on DTCs, refer to **"OBD II Diagnostic Trouble Codes (DTCs)**" on page 2-15

Screens

Certain help messages, information, and data that are displayed on the scan tool are also shown in graphical text boxes. The screens are presented as examples and may change as the software is updated.

Example:



Section 2 – Getting Started

Introduction

The Scan Tool was developed by experts in the automotive service industry to help diagnose vehicles and assist in troubleshooting procedures.

The Scan Tool monitors vehicle events and retrieves codes from the vehicle's control modules to help pinpoint problem areas.

All information, illustrations and specifications contained in this manual are based on the latest information available from industry sources at the time of publication.

No warranty (expressed or implied) can be made for its accuracy or completeness, nor is any responsibility assumed by the manufacturer or anyone connected with it for loss or damages suffered through reliance on any information contained in this manual or misuse of accompanying product. The manufacturer reserves the right to make changes at any time to this manual or accompanying product without obligation to notify any person or organization of such changes.

Using the CD

✓ The included CD is **NOT** required to operate the Scan Tool

✓ Install the CD application prior to connecting the Scan Tool to the PC.

✓ Some of the items included on the CD are:

- ❒ Manuals included with Scan Tool
- ❒ DTC lookup software
- ❒ Scan Tool update software
- ❒ Adobe Acrobat Reader Installer
- ❒ Print Capture
- ❒ Other product information

✓ To be able to use the included CD the PC must meet the following minimum requirements:

- ❒ 486 PC
- ❒ 4 MB of RAM
- ❒ Microsoft Windows 98 SE, ME, 2000 and XP
- ❒ CD ROM Drive
- ❒ Adobe Acrobat Reader
- ❒ Internet Explorer 4.0 or newer
- ❒ Screen Resolution of 800 x 600
  - – If screen resolution is 800 x 600, in Display Properties, Settings Tab, set Font Size to Small Fonts.

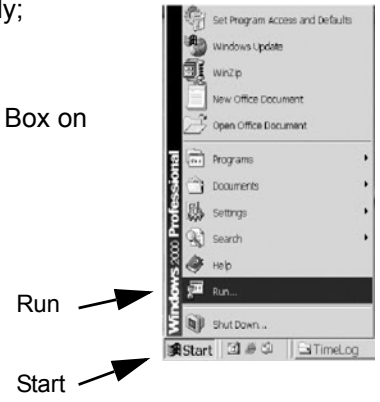
Installing Applications On Included CD

1. **Close all programs on the computer.**

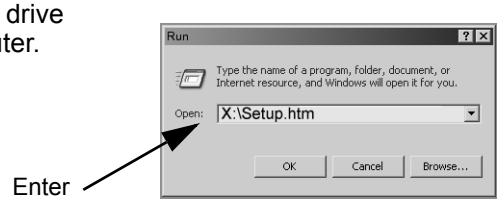
2. **Place the CD in CD-Drive.**

✓ If CD does not start automatically;

- ❒ Select the ***Start*** button.
- ❒ Select ***Run...***
- ❒ Enter "*X*:\Setup.htm" in Open Box on Computer and select OK.



❒ "*X*" is the CD-ROM drive letter on the computer.



3. **Follow screen prompts on the computer to install the applications.**

Vehicle Service Information

The following is a list of web sites and phone numbers where electronic engine control (EEC) diagnostic information is available.

✓ Some manuals may be available at your local dealer, auto parts stores or local public libraries.

Domestic Vehicles	Web Site	Phone Number
General Motors		
Chevrolet	www.chevrolet.com	1-800-551-4123
Pontiac	www.pontiac.com	1-800-551-4123
Oldsmobile	www.oldsmobile.com	1-800-551-4123
Buick	www.buick.com	1-800-551-4123
Cadillac	www.cadillac.com	1-800-333-4CAD
Saturn	www.saturn.com	1-800-553-6000
Ford		
Ford	www.ford.com	1-800-392-3673
Lincoln	www.lincoln.com	1-800-392-3673
Mercury	www.mercury.com	1-800-392-3673
Chrysler		
Chrysler	www.chrysler.com	1-800-348-4696
Dodge	www.dodge.com	1-800-348-4696
Plymouth	Not Available	1-800-348-4696
Eagle	Not Available	1-800-348-4696

European Vehicles		
Audi	www.audi.com	1-800-544-8021
Volkswagon	www.vw.com	1-800-544-8021
BMW	www.bmw.com	1-201-307-4000
MINI	www.mini.com	1-201-307-4000
Jaguar	www.jaguar.com	1-800-4-JAGUAR
Volvo	www.volvo.com	1-800-458-1552
Mercedes-Benz	www.mercedes-benz.com	1-800-367-6372
Land Rover	www.landrover.com	1-800-637-6837
Porsche	www.porsche.com	1-800-PORSCHE
Saab	www.saab.com	1-800-955-9007

Asian Vehicles	Web Site	Phone Number
Acura	www.acura.com	1-800-999-1009
Honda	www.honda.com	1-800-999-1009
Lexus	www.lexus.com	1-800-255-3987
Scion	www.scion.com	1.866.70.SCION
Toyota	www.toyota.com	1-800-GO-TOYOTA

Hyundai	www.hyundai.com	1-800-633-5151
Infiniti	www.infiniti.com	1-800-662-6200
Nissan	www.nissanusa.com	1-800-nissan1
Kia	www.kia.com	1-800-333-4542
Mazda	www.mazda.com	1-800-222-5500
Daewoo	www.daewoo.com	1-822-759-2114
Subaru	www.subaru.com	1-800-SUBARU3
Isuzu	www.isuzu.com	1-800-255-6727
Geo	Not Available	Not Available
Mitsubishi	www.mitsubishi.com	1-888-MITSU2004
Suzuki	www.suzukiauto.com	1-800-934-0934

Other Manuals

Chilton Book Company	www.chiltonsonline.com	1-800-347-7707
Haynes Publications	www.haynes.com	1-800-242-4637
Bentley Publishers	www.bentleypublishers.com	1-800-423-4595

Repair Information Programs

Mitchell	www.mitchell1.com	1-888-724-6742
ALLDATA	www.alldata.com	1-800-697-2533

Suitable Manual Titles

Diagnostic Service Manuals

PowerTrain Codes and Oxygen Sensors

Automotive Emission Control Manual

Fuel Injection

Automotive Electrical Manual

Automotive Electrics and Electronics

Automotive Sensors

Electronic Transmission Control

Emission Control Technology

Engine Management

or similar titles...

Introduction to On-Board Diagnostics

OBD II

On-board diagnostics version II (OBD II) is a system that the Society of Automotive Engineers (SAE) developed to standardize automotive electronic diagnosis.

Beginning in 1996, most new vehicles sold in the United States were fully OBD II compliant.

✓ Technicians can now use the same tool to test any OBD II compliant vehicle without special adapters. SAE established guidelines that provide:

- ❒ A universal connector, called the DLC, with dedicated pin assignments.
- ❒ A standard location for the DLC, visible under the dash on driver's side.
- ❒ A standard list of diagnostic trouble codes (DTCs) used by all manufacturers.
- ❒ A standard list of parameter identification (PID) data used by all manufacturers.
- ❒ Ability for vehicle systems to record operating conditions when a fault occurs.
- ❒ Expanded diagnostic capabilities that records a code whenever a condition occurs that affects vehicle emissions.
- ❒ Ability to clear stored codes from the vehicle's memory with a Scan Tool.

SAE Publications

SAE has published hundreds of pages of text defining a standard communication protocol that establishes hardware, software, and circuit parameters of OBD II systems.

- SAE publishes recommendations, not laws, but the Environmental Protection Agency (EPA) and California Air Resources Board (CARB) made many of SAE's recommendations legal requirements.

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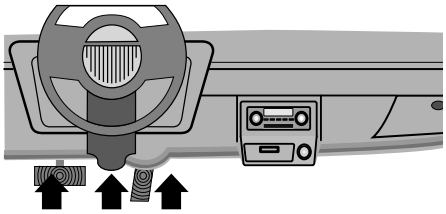
Diagnostic Link Connector (DLC)

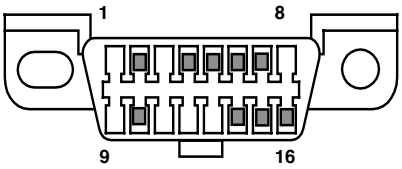
The Data Link Connector (DLC) is used with scan tool to communicate with the vehicle's control module.

✓ Data Link Connector Location.

- ❒ Under dashboard on driver side of vehicle.
- ❒ If Data Link Connector is not located under dashboard, a label should be there telling location.



Data Link Connector (DLC) Pins



1 - Manufacturer Reserved
2 - J1850 Bus+
3 - Manufacturer Reserved
4 - Chassis Ground
5 - Signal Ground
6 - CAN High, J-2284
7 - K Line, ISO 9141-2 & ISO/DIS 14230-4
8 - Manufacturer Reserved
9 - Manufacturer Reserved
10 - J1850 Bus-
11 - Manufacturer Reserved
12 - Manufacturer Reserved
13 - Manufacturer Reserved
14 - CAN Low, J-2284
15 - L Line, ISO 9141-2 & ISO/DIS 14230-4
16 - Battery Power

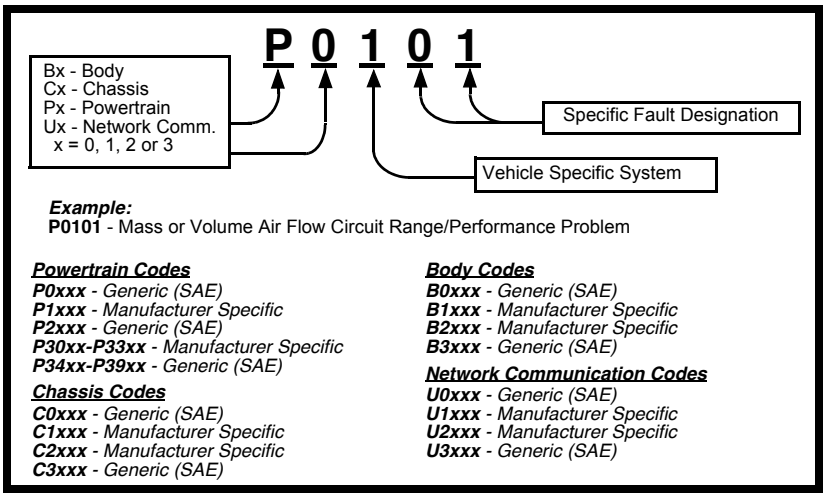
OBD II Diagnostic Trouble Codes (DTCs)

✓ DTCs are used to help determine the cause of a problem or problems with a vehicle.

❒ DTCs consist of a five-digit alphanumeric code.

❒ The DTCs format and general code types are shown below.

.



Within each category (Powertrain, Chassis, Body and Network) of DTCs there are assigned ranges for different vehicle systems.

Lower	Upper	Assigned DTC System
P0000	P00FF	Fuel Air Metering Auxiliary Emission Controls
P0100	P02FF	Fuel Air Metering
P0300	P03FF	Ignition System or Misfire
P0400	P04FF	Auxiliary Emission Controls
P0500	P05FF	Vehicle Speed Idle Control Auxiliary Inputs
P0600	P06FF	Computer and Auxiliary Outputs
P0700	P09FF	Transmission
P0A00	P0AFF	Hybrid Propulsion
P1000	P10FF	Manufacturer Control Fuel & Air Metering, Auxiliary Emission Controls
P1100	P12FF	Manufacturer Control Fuel & Air Metering
P1300	P13FF	Manufacturer Control Ignition System or Misfire
P1400	P14FF	Manufacturer Control Auxiliary emission Controls
P1500	P15FF	Manufacturer Cntrl Veh.Spd. Idle Speed Control Auxiliary Inputs

Lower	Upper	Assigned DTC System
P1600	P16FF	Manufacturer Control Auxiliary Inputs Auxiliary Outputs
P1700	P19FF	Manufacturer Control Transmission
P2000	P22FF	Fuel Air Metering Auxiliary emission Controls
P2300	P23FF	Ignition System or Misfire
P2400	P24FF	Auxiliary Emission Controls
P2500	P25FF	Auxiliary Inputs
P2600	P26FF	Computer and Auxiliary Outputs
P2700	P27FF	Transmission
P2900	P32FF	Fuel Air Metering Auxiliary Emission Controls
P3300	P33FF	Ignition System
P3400	P34FF	Cylinder Deactivation
U0000	U00FF	Network Electrical
U0100	U02FF	Network Communication
U0300	U03FF	Network Software
U0400	U04FF	Network Data

✓ J2012 and ISO 15031-6 are standards for all DTCs, established by the SAE, International Organization for Standardization (ISO) and other governing bodies.

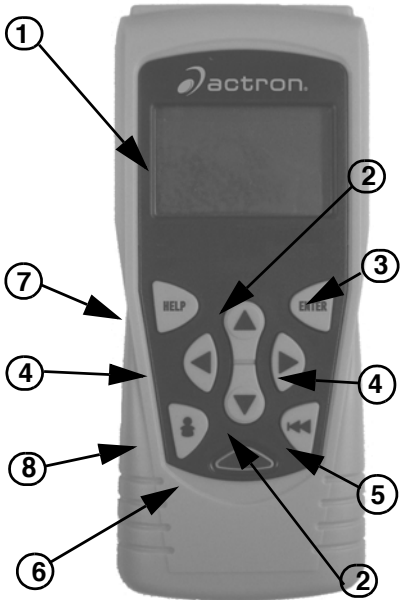
- ❒ Codes and definitions assigned by these specifications are known as Generic OBD II codes.
- ❒ OBD II requires compliance to these standards for all cars, light trucks, APVs, MPVs, and SUVs sold in the United States.
- ❒ Codes not reserved by the SAE are reserved for the manufacturer and referred to as Manufacturer Specific Codes.

2

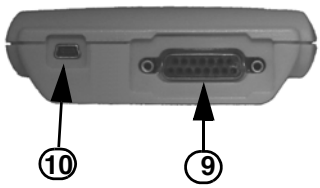
Section 3 – Using The Scan Tool

The Scan Tool

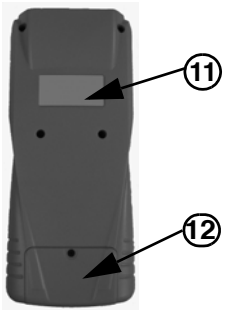
① **LCD Display** – backlit, 128 x 64 pixel display with contrast adjustment.
② **UP** and **DOWN** arrow keys – moves selection UP or DOWN, or selects YES or NO.
③ **ENTER** key – selects displayed items.
④ **LEFT** and **RIGHT** arrow keys – selects YES or NO, and selects data parameters for custom data list.
⑤ **BACK** key – goes to the previous screen or level.
⑥ **ON/OFF** key – turns power ON or OFF.
⑦ **HELP** key – accesses the Help Function.
⑧ **USER** key - allows the operator to perform Read Codes with a touch of a key.
⑨ **DLC Cable** – provides connection for vehicle interface.
⑩ **USB Port** – provides a USB connection for the computer.
⑪ **Serial Number Plate** – provides serial number of Scan Tool.
⑫ **Battery Compartment** – provides power to the Scan Tool when reprogramming from a personal computer or off-vehicle reviewing of codes and printing.



Top of Scan Tool



Back of Scan Tool



Specifications

Display: Backlit, 128 x 64 pixel display with contrast adjust
Operating Temperature: 0 to 50°C (32 to 122°F)
Storage Temperature: -20 to 70°C (-4 to 158°F)
Internal Power: 9V Battery
External Power: 7 to 16 Volts

✓ A minimum of 8.0 V is required for most control modules to operate properly in a vehicle.

Power Dissipation: 5 Watts maximum.

Dimensions:	Height	Width	Length
	7/8"	3.50"	8.25"
	22.56 mm	89 mm	210 mm

Included with Scan Tool

Part	Part Description
CD	The CD contains the Manual in English, French and Spanish. The CD also includes a DTC lookup program for looking up DTCs.
USB Cable	Used to print and upgrade software depending on tool.
OBD II Cable	Communicate between the vehicle and tool. Also supplies power to the tool.
Carry Case	Place to store the Scan Tool when tool is not in use.
Warranty & Registration Card	Provides you with the ability to keep up to date with the newest updates and technology available.

✓ **Replacement Parts** are available from the manufacturer by contacting customer service.

• Phone at **1-800-228-7667** (8:00 - 6:00 EST Monday - Friday)

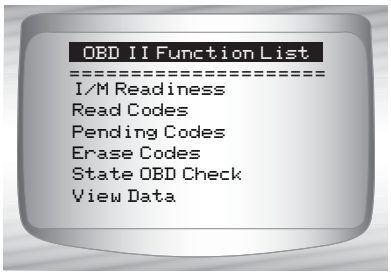
Display

The display has a large viewing area displaying messages, instructions, and diagnostic information.

✓ The back-lit liquid crystal display (LCD) is a 128 x 64 pixel display.

❒ Characters used to help operate the Scan Tool are:

- Indicates cursor location.
- ? Indicates when Help is available.
- Indicates additional information is available on previous screen by using the ▲ **UP** arrow key.
- Indicates additional information is available on next screen by using the ▼ **DOWN** arrow key.
- Indicates internal batteries need replaced or are not installed.



Keypad

The keypad is used to move through the different menus of the Scan Tool. The Scan Tool's software is designed for ease in operating and navigating through menus.

⚠CAUTION Do not use solvents such as alcohol to clean keypad or display. Use a mild nonabrasive detergent and a soft cotton cloth.

⚠CAUTION Do not soak keypad as water might find its way inside the Scan Tool.

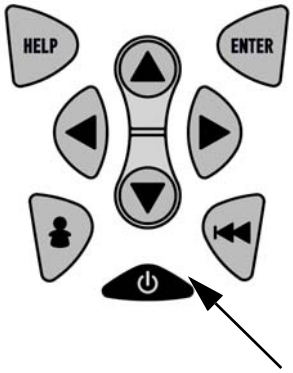
Scan Tool Power UP

✓ Refer to **Scan Tool Does Not Power Up** in section 5 **Troubleshooting** on page 5-2 if there are problems.

Internal Battery

✓ **ON/OFF** button on Scan Tool turns tool on and off.

❒ Press and hold **ON/OFF** key for at least 1 second to turn on Scan Tool.



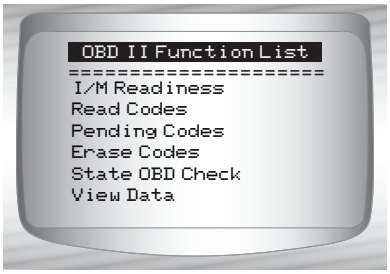
✓ The Scan Tool will automatically turn off after 1.5 minutes of inactivity when powered from internal 9V Battery.

✓ When powered from the internal battery, the Scan Tool disables the display's backlighting and turns OFF after a period of inactivity.

✓ Each time the Scan Tool is powered up, voltage of the internal battery is checked.

❒ If voltage is low, the Low Battery Symbol ( ) displays on screen.

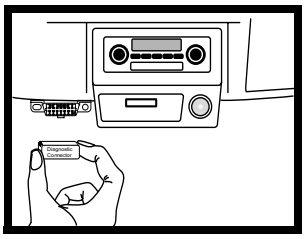
❒ Replace the battery using instructions provided in Battery Replacement.



⚠CAUTION If the Scan Tool will not be used for an extended period of time, remove the battery to prevent battery leakage from damaging the battery compartment.

Vehicle Power

When using the OBD II Cable, the power to the Scan Tool comes from the vehicle DLC.



✓ Scan Tool will automatically turn on when connected to vehicle.

System Setup

✓ ***System Setup*** allows:

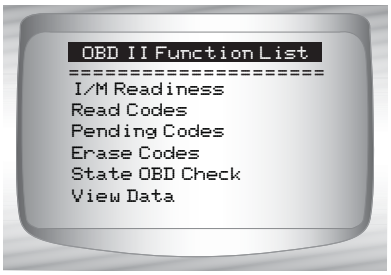
- ❒ Display contrast to be changed.
- ❒ Scan Tool information to be viewed.
- ❒ Display to be checked.
- ❒ Operation of the keypad to be checked.
- ❒ Memory of the tool to be checked.
- ❒ Scan Tool to be upgraded.

✓ ***System Setup*** settings remain until internal battery becomes discharged or is removed.

From ***Main Menu*:**

1.Select *System Setup.*

- •Use ▲ **UP** or ▼ **DOWN** arrow key until ***System Setup*** is highlighted.
- •Press ENTER **ENTER.**

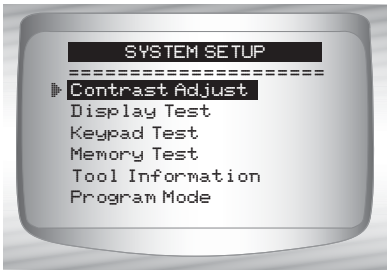


Changing Display Contrast

From ***System Setup*** screen:

1.Select *Contrast Adjust.*

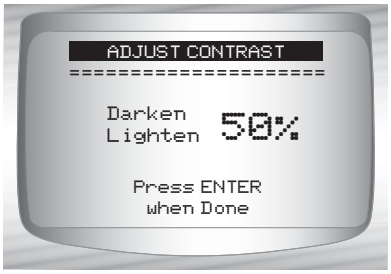
- Use ▲ **UP** or ▼ **DOWN** arrow key until ***Display Contrast*** is highlighted.
- Press ENTER **ENTER.**



3

2.Increase or Decrease Display Contrast.

- Use ▲ **UP** arrow key to increase Contrast.
- Use ▼ **DOWN** arrow key to decrease Contrast.



3.Save Contrast Setting.

•Press **ENTER.**

✓ Press **ENTER** again to return to the***System Setup*** menu.

View Tool Information

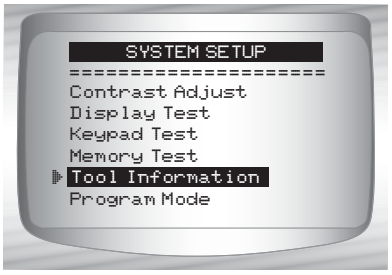
✓ This function allows you to view specific tool information that may be needed when contacting customer service.

From ***System Setup*** menu:

1.Select *Tool Information.*

•Use **UP** or **DOWN** arrow key until ***Tool Information*** is highlighted.

•Press **ENTER.**



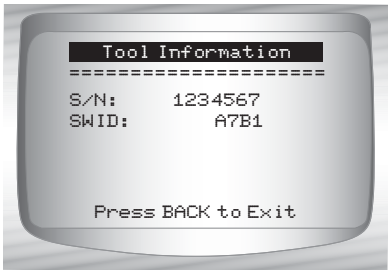
2.View Information:

❒S/N (Serial No:)

❒Software ID (SW ID:)

3.Write Down Scan Tool Information.

• Space is provided on inside front cover to record the Scan Tool information.

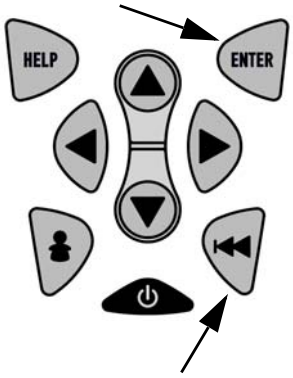


4.Return to *Setup Tool* Menu.

•Use the **BACK** key.

OR

•Use the **ENTER** Key.



Display Test

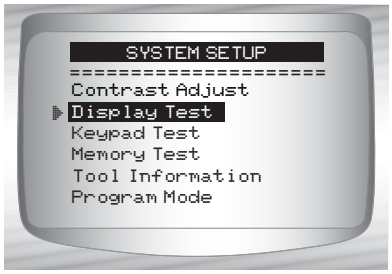
The ***Display Test*** is used to check the display.

✓ The test fills every pixel of the display with a solid black character.

From ***System Setup*** menu:

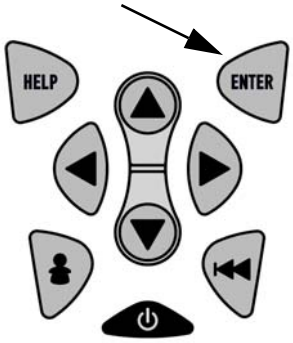
1.Select *Display Test.*

•Use **UP** or **DOWN** arrow key until ***Display Test*** is highlighted.



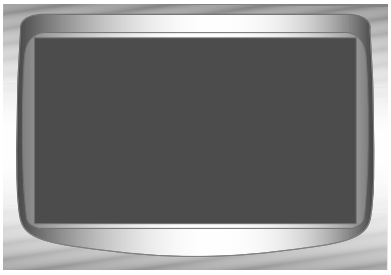
2. Start *Display Test.*

•Press **ENTER.**

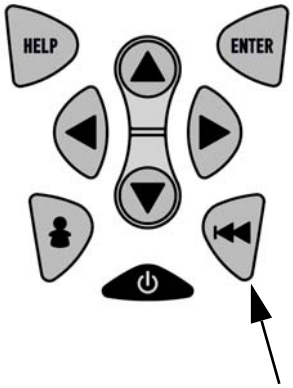


3. Look for Missing Spots.

- All characters display in solid black if there are no concerns.
- Screen flips back and forth between screens shown below.



4. When Done, Press BACK Key.



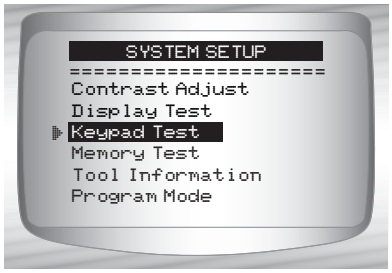
Keypad Test

The ***Keypad Test*** is used to verify keys are working correctly.

From ***System Setup*** menu:

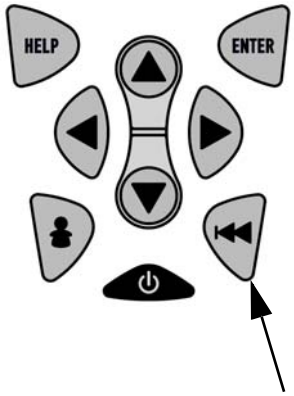
1.Select *Keypad Test.*

- Use **UP** or **DOWN** arrow key until ***Keypad Test*** is highlighted.
- Press **ENTER.**



2. Press a KEY.

- Key name or scroll direction should inverse colors on display.
- The only exception is the **BACK** key. When **BACK** key is pressed, ***System Setup*** menu returns.



✓ If ***System Setup*** menu does not return, then **BACK** key is not working correctly.

3 Memory Test

✓ The ***Memory Test*** will test RAM and Flash ROM.

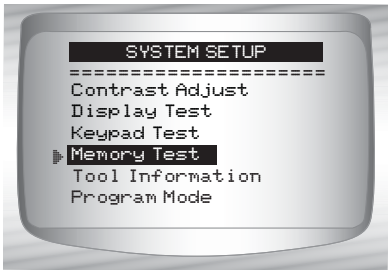
✓ Run the ***Memory Test*** if the tool has trouble:

- ❒ Playing back recorded data.
- ❒ Displaying trouble code definitions.
- ❒ Doing any function that uses internal memory.

From ***System Setup*** menu:

1.Select *Memory Test.*

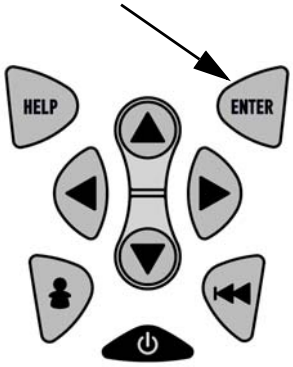
- •Use **UP** or **DOWN** arrow key until ***Memory Test*** is highlighted.
- •Press **ENTER.**



✓ The tool reports its progress on the bottom of the display.

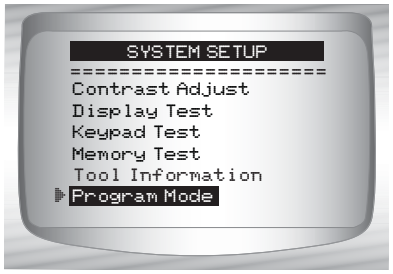
- ❒ ***Memory Test*** may take several minutes to complete.
- ❒ ***Memory Test*** results display.
  - ❒ If no problems were detected, then PASS is displayed
  - ❒ If RAM fails, an error message is shown.
  - ❒ If ROM fails, a checksum is shown.

2. Return to *System Setup* menu.
•Press ENTER **ENTER.**



Program Mode

The Program Mode is used for updating the Scan Tool. Instructions are provided with upgrades.



Connecting The Scan Tool

To diagnose a vehicle, connect the OBD II Cable to the Scan Tool.

If you just want to power up the tool to do self-tests, code lookup, review or printing data from the last vehicle tested, then you do not need to attach the OBD II Cable. The internal battery provides power for this.

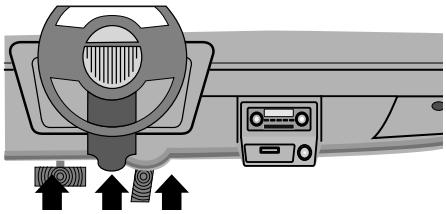
1.Connect OBD II Cable to Scan Tool

•Make sure pins are not bent.

2.Find DLC on vehicle.

•Look under the dashboard on the driver's side of the vehicle.

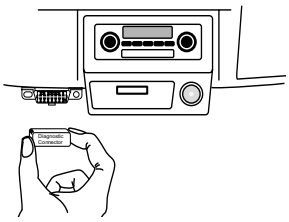
•If the DLC is not located under the dashboard, a label should be there telling the location.



3.Remove DLC cover if required.

4.Connect OBD II Cable to vehicle.

•Make sure pins are not bent.



Vehicle Selection

Vehicle Selection will be displayed for **Read Codes** and **Pending Codes** when a manufacturer specific DTC was retrieved from the vehicle. Vehicle selection may also be required when looking up a manufacturer specific DTC in **Code Lookup**.

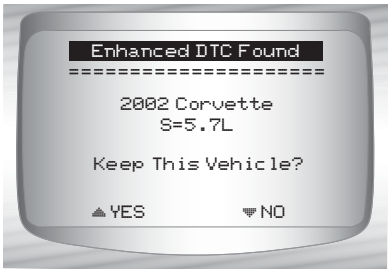
1.Select desired vehicle to diagnose.

- Use ▲ **UP** or ▼ **DOWN** arrow key to highlight.
  - ❒ Global OBD II
  - ❒ Domestic Vehicles
  - ❒ European Vehicles
  - ❒ Asian Vehicles
- Press ENTER **ENTER.**

✓ If vehicle displayed is not the vehicle being diagnosed select ***CHANGE*** and go to step 3.

2.Confirm selection.

- Use ◄ **LEFT** or ► **RIGHT** arrow keys.
- Press ENTER **ENTER.**



✓ If keeping the selected vehicle select **YES**.

✓ If changing the selected vehicle select **NO**.

✓ On GM vehicles the tool may require you to look at the VIN to determine the Series, Model, Engine Size and more.

❒ For example a GM Tahoe may be considered a K1500 series.

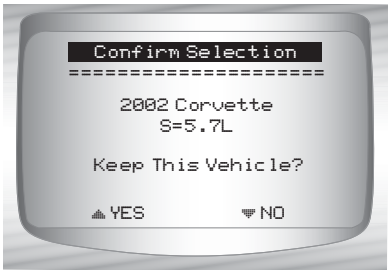
GM Typical VIN

VIN Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Description of Number					Series	Line Chassis	Chassis Type	Engine Type		Model Year							

✓ If Domestic, Asian or European Vehicles is selected, the tool may ask for the following information:

❒ Manufacturer
❒ Car/Truck
❒ Year
❒ Make
❒ Model
❒ Engine
❒ Special Information

3.*Confirm selection*.
•Use **YES** or **NO**.



Review Data

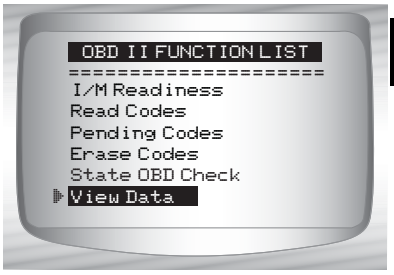
✓ The ***Review Data*** function allows the user to view the information from the previous vehicle tested.

✓ ***Review Data*** is available from both the Main Menu and OBD II function list.

✓ Scan Tool does not require power from the vehicle to use the ***Review Data*** function.

1. Select *Review Data.*

- Use **UP** or **DOWN** arrow key until ***Review Data*** is highlighted.
- Press **ENTER.**

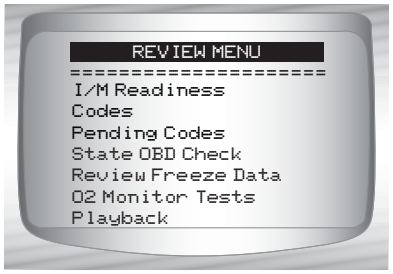


Refer to appropriate section of this manual for what functions have data for review.

2.Follow prompts and instructions provided by Scan Tool.

✓ If data does not exist for function selected to review, a message informs the user to run a function first.

✓ Only 1 function, ***Playback***, needs detailed instructions.



Playback

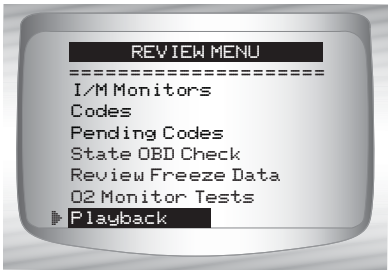
The ***Playback*** function is used to playback a recording.

✓ This function is very similar to ***View Data***. The only difference is that ***View Data*** is real time viewing of PIDs, while ***Playback*** is a viewing of previously recorded PIDs.

From the ***Review Data*** menu:

1.Select *Playback.*

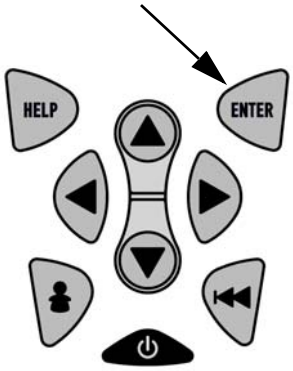
•Use ▲ **UP** or ▼ **DOWN** arrow key until ***Playback*** is highlighted.



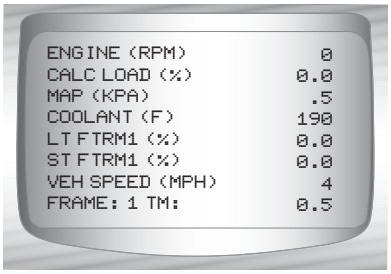
✓ Scan Tool displays a NO RECORDING PRESENT message if recording does not exist.

2. Play Back Recording.

•Press **ENTER.**



✓ The ***Playback*** has frame number and timestamp (in seconds).

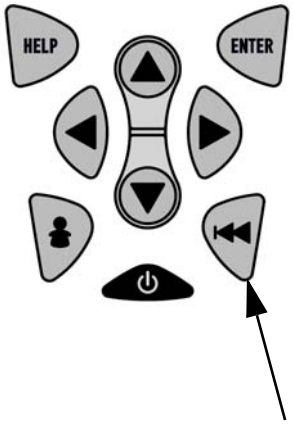


- ❒ Negative frames and timestamps indicate data recorded before trigger event.
- ❒ Positive frames and timestamps indicate data recorded after trigger event.
- ❒ Use ▲ **UP** or ▼ **DOWN** arrow keys to view recorded PID data of each frame.
- ❒ Use ◄ **LEFT** or ► **RIGHT** arrow keys to scroll back and forth through frames.

✓ Different vehicles communicate at different speeds and support a different number of PIDs. Therefore, the maximum number of frames that can be recorded varies.

✓ Some vehicles wait a long period of time to store a DTC after a driveability problem occurs. If the operator selected Trigger On Codes when making a recording, the operator might not see any drastic change in data parameters before and after trigger point.

3.Return to *Review Data* menu**.**
•Press ⏮ **BACK.**



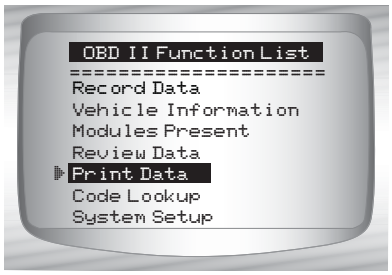
Print Data

The **Print Data** function allows the printing of diagnostic information stored in the Scan Tool.

- ✓ The Scan Tool's internal battery power can be used to print data.
- ✓ **Print Data** is available from both the **Main Menu** and **OBD II Function List**.
- ✓ Make sure you have previously installed the PC software in **Using the CD**.
- ✓ Launch Scanning Suite and then start printing application.
- ✓ Follow all instructions on PC.

1. Select *Print Data* from the **OBD II Function List.**

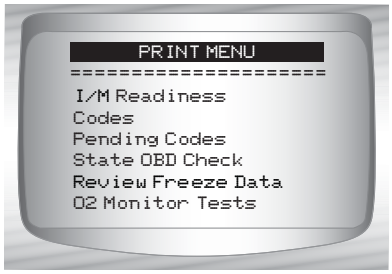
- •Use ▲ **UP** or ▼ **DOWN** arrow key until ***Print Data*** is highlighted.
- •Press ENTER **ENTER.**



- ✓ When printing playback data, Start Frame and End Frame need to be defined.

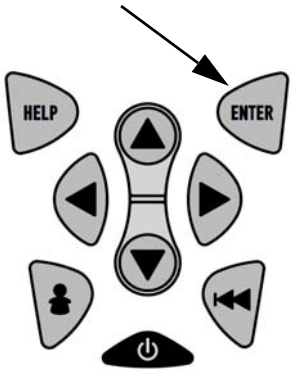
2. Select Data To Be Printed.

- •Use ▲ **UP** or ▼ **DOWN** arrow key.
- •Press ENTER **ENTER.**



✓ When selected data does not exist in the Scan Tool's memory, a message informs the user to run the function.

3.Return to *Select Print Data* screen.
•Press **ENTER.**



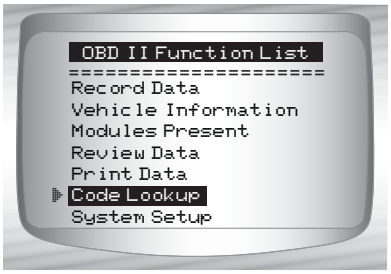
Code Lookup

Code Lookup is used to look up definitions of DTCs stored in the Scan Tool.

✓ The Scan Tool does not require power from the vehicle to perform this function.

✓ **Code Lookup** is available from both the **Main Menu** and **OBD II Function List.**

1.Select *Code Lookup.*
•Use **UP** or **DOWN** arrow key until ***Code Lookup*** is highlighted.
•Press **ENTER.**



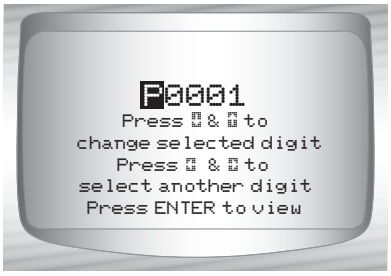
2.Select a Vehicle
•See **Vehicle Selection** for details regarding this step

✓ This step is available only if a vehicle has not been selected since the tool was powered up.

✓ Selecting a vehicle may provide the user with a manufacturer definition when looking up manufacturer specific codes.

3.Enter code.

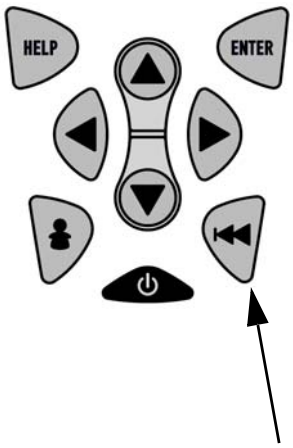
- •All characters must be entered
- •Only one character can be changed at a time.
- •Use **LEFT** or **RIGHT** arrow keys to scroll to desired character.
- •Use **UP** or **DOWN** arrow keys to change selected character.
- • Press **ENTER.**



✓ If definition could not be found (SAE or Enhanced), the Scan Tool displays No DTC Definition Found. See Service Manual. If the DTC is manufacturer specific the DTC is assigned to display. Refer to the vehicle service manual for exact definition.

✓ To enter another DTC, press **BACK**.

✓ Press **BACK** again to return to menu from which **Code Lookup** was selected.



Section 4 – Vehicle Diagnostics

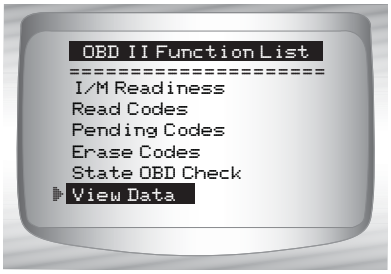
✓ The first time the scan tool links to the vehicle, the communication protocol is automatically detected, and is used until the Scan Tool is turned off.

✓ If an **Error Message** displays, make sure the OBDII connector is attached, and the ignition key is on. Cycle ignition key to off for 10 seconds, then on. This may be required to reset computer. If required, select yes to try again. If problem still exists, refer to"**Error Messages**" on page 5-2 of **Troubleshooting**.

✓ The Scan Tool keeps all data received from the last vehicle selected until any of the following occurs:

- ❒ The internal 9V battery is discharged or has been removed.
- ❒ Scan Tool is flash programmed to update software, or to change language.
- ❒ Data from last vehicle tested is erased.

OBD II Function List



- ❒ **I/M Readiness**
- ❒ **Read Codes**
- ❒ **Pending Codes**
- ❒ **Erase Codes**
- ❒ **State OBD Check**
- ❒ **View Data**
- ❒ **View Freeze Data**
- ❒ **Drive Cycle Monitor**
- ❒ **O2 Monitor Test**
- ❒ **Diag Monitor Test**
- ❒ **On-Board Systems**
- ❒ **Record Data**
- ❒ **Vehicle Information**
- ❒ **Modules Present**
- ❒ **Review Data**
- ❒ **Print Data**
  - – I/M Readiness
  - – Codes
  - – Pending Codes
  - – State OBD Check
  - – View Freeze Data
  - – O2 Monitor Test
  - – Diag Monitor Test
  - – Playback
  - – Vehicle Info
  - – Modules Present
- ❒ **Code Lookup**
- ❒ **System Setup**

I/M Readiness

The ***I/M Readiness*** (Inspection / Maintenance) function is used to view a **snapshot** of the operations for the emission system on OBD II vehicles.

✓ I/M Readiness is a very useful function. To guarantee no faults exist make sure all monitors are **ok** or **n/a** and **no DTC's** exist.

✓ Refer to the vehicles service manual for the drive cycle operation.

✓ During normal driving conditions, the vehicle's computer scans the emission system. After a specific amount of drive time (each monitor has specific driving conditions and time required), the computer's monitors decide if the vehicles emission system is working correctly or not as well as detecting out of range values. When the monitor's status is:

- **ok -** vehicle was driven enough to complete the monitor.
- **inc (Incomplete) -** vehicle was not driven enough to complete the monitor.
- **n/a (Not Applicable)-** vehicle does not support that monitor.

✓ Depending on vehicle, disconnecting or a discharged battery may erase DTCs and clear monitor status.

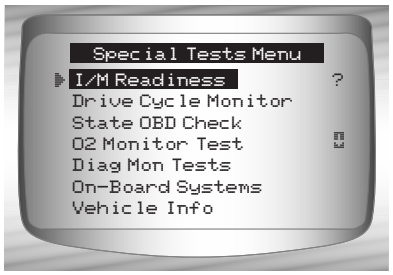
✓ Monitors may be cleared by:

- ❒ Erasing codes
- ❒ Vehicle control modules losing power

✓ ***I/M Readiness*** can be done with the KOER or KOEO.

From ***OBD II Function List:***

1. **Select *I/M Readiness.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***I/M Readiness*** is highlighted.
   - Press ENTER **ENTER.**



Two types of ***I/M Readiness*** tests are:

- ***Since DTCs Cleared -*** shows status of the monitors since the DTCs were last erased.
- ***This Drive Cycle -*** shows status of monitors since the start of the current drive cycle. Refer to the vehicle service manual for more detailed information on emission-related monitors and their status.

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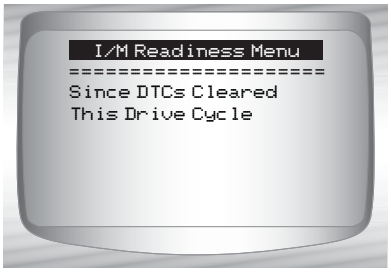
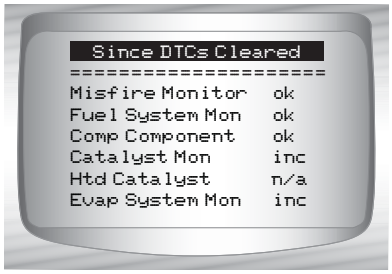
✓ Some vehicles **do not** support ***This Drive Cycle***. If vehicle supports both types of monitors the ***I/M Readiness Menu*** displays.



2. **View Summary of Monitor Status.**
   - Use ▲ **UP** or ▼ **DOWN** arrow key.

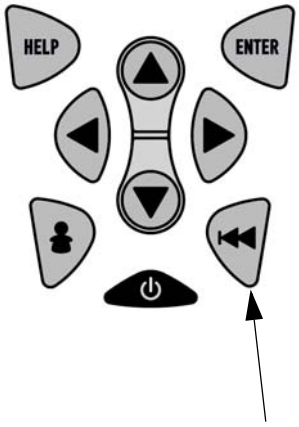
✓ Depending on ***Readiness Test*** one of these 2 screens will be present.



Abbreviations and names for OBD II Monitors supported by the Scan Tool are shown below. They are required by the United States Environmental Protection Agency (EPA). Not all monitors are supported by all vehicles.

•**Abbreviated Name**	**Expanded Name**
- Misfire Monitor	Misfire Monitor
- Fuel System Mon	Fuel System Monitor
- Comp Component	Comprehensive Components Monitor
- Catalyst Mon	Catalyst Monitor
- Htd Catalyst	Heated Catalyst Monitor
- Evap System Mon	Evaporative System Monitor
- Sec Air System	Secondary Air System Monitor
- A/C Refrig Mon	Air Conditioning Refrigerant Monitor
- Oxygen Sens Mon	Oxygen Sensor Monitor
- Oxygen Sens Htr	Oxygen Sensor Heater Monitor
- EGR System Mon	Exhaust Gas Recirculation System Monitor

3. **Return to *OBD II Function List.***
   •Press **BACK**.



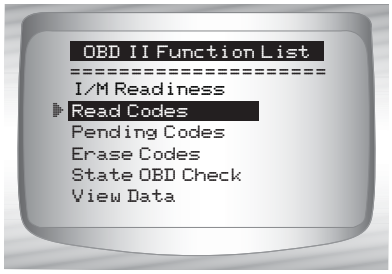
Read Codes

✓ The ***Read Codes*** function allows the Scan Tool to read the DTCs from the vehicle's control modules. DTCs are used to help determine the cause of a problem or problems with a vehicle. These codes cause the control module to illuminate the malfunction indicator lamp (MIL) when emission-related or driveability fault occurs. MIL is also known as service engine soon or check engine lamp.

✓ ***Read Codes*** can be done with the key on engine off (KOEO) or with the key on engine running (KOER).

From ***OBD II Function List***:

1. **Select *Read Codes.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Read Codes*** is highlighted.
   - Press ENTER **ENTER.**



✓ If no DTCs are present a message stating ***System Pass: No Faults Detected*** is displayed.

2. **Select a vehicle**
   - See **Vehicle Selection** for details regarding this step.

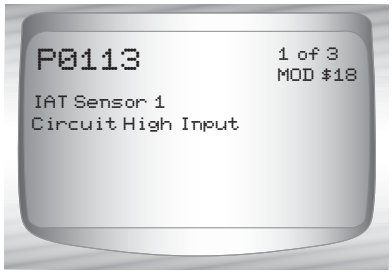
✓ This step is available only if manufacturer's specific enhanced DTCs were read from the vehicle and a vehicle has not been selected since the tool was powered up.

✓ Selecting a vehicle may provide the user with the manufacturer's definition for the manufacturer specific DTC(s) returned by the vehicle.

3. View and write down DTCs.

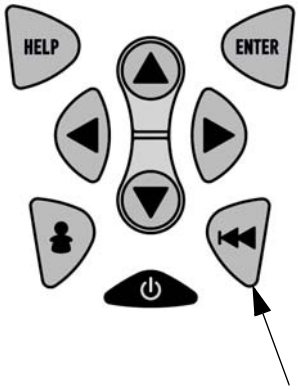
•Use ▲ **UP** or ▼ **DOWN** arrow key.

❒ In the example shown module $18 is reporting the DTCs.



4. Return to *OBD II Function List.*

• Press ◄◄ **BACK.**



Pending Codes

Pending Codes are also referred to as continuous monitor or maturing codes. An intermittent fault causes the control module to store a code in memory. If the fault does not occur within a certain number of warm-up cycles (depending on vehicle), the code clears from memory. If fault occurs a specific number of times, the code matures into a DTC and the MIL illuminates or blinks. This function can be used with KOEO or KOER

The ***Pending Codes*** function is used to read any pending codes which may be currently set.

✓ ***Pending Codes*** may be set by emission related powertrain components and systems.

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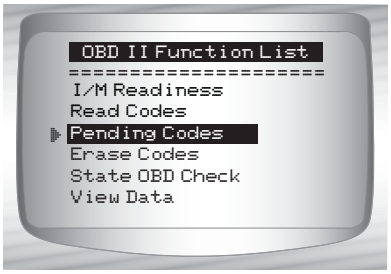
✓ ***Pending Codes*** faults **do not** automatically indicate a faulty component or system.

From the ***OBD II Function List***:

1. **Select *Pending Codes***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Pending Codes*** is highlighted
   - Press ENTER **ENTER.**



✓ If no ***Pending Codes*** are present a message stating ***System Pass: No Faults Detected*** is displayed. (Do not mistake this message. It refers **only** to Pending Codes and is not a warning of DTCs.)

2. **Select a Vehicle*.***
   - See **Vehicle Selection** for details regarding this step.

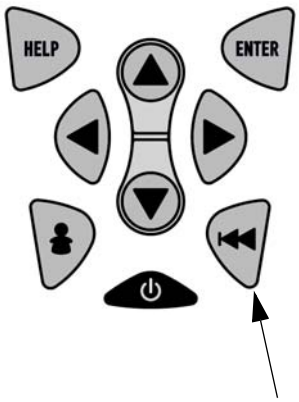
✓ This step is available only if manufacturer's specific enhanced DTCs were read from the vehicle and a vehicle has not been selected since the tool was powered up.

✓ Selecting a vehicle may provide the user with the manufacturer's definition for the manufacturer specific DTC(s) returned by the vehicle.

3. **If *Pending Codes* are Present.**
   •View and write down codes using ▲ **UP** or ▼ **DOWN** arrow key.

✓ See **"Read Codes"** on page 4-6 for details of how DTCs are shown.

4. **Return to *OBD II Function List.***
   • Press ◄◄ **BACK**.



Erase Codes

The ***Erase Codes*** function deletes DTCs and ***I/M Readiness*** data from vehicle's control module(s). Perform this function with KOEO. **Do not start the engine.**

✓ The ***Erase Codes*** function may also erase ***View Freeze Data***, ***O2 Monitor Test***, and ***Diagnostic Monitor Test*** results depending on vehicle.

✓ The ***Erase Codes*** function sets monitors to ***inc***.

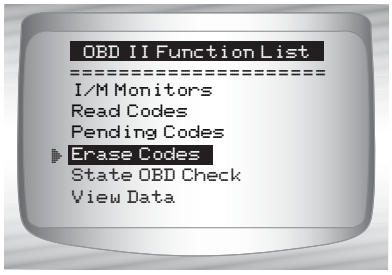
✓ Perform ***Erase Codes*** function **only** after systems have been checked completely and DTCs have been written down.

✓ After servicing the vehicle, erase stored DTCs and verify no codes have been reset. If a DTC returns, problem has not been fixed or other faults are present.

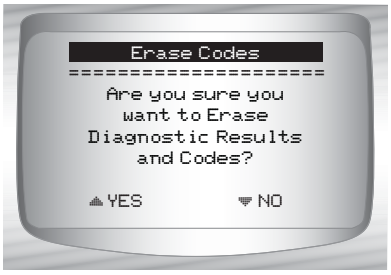
✓ Depending on which monitor sets a code the vehicle may need to be driven and the monitor run before concluding that the fault is repaired.

From ***OBD II Function List:***

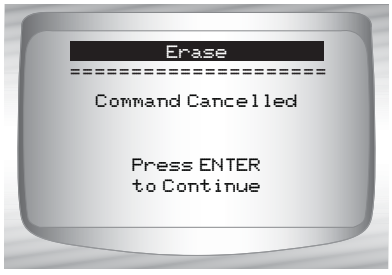
1. **Select *Erase Codes.***
   - Use **UP** or **DOWN** arrow key until ***Erase Codes*** is highlighted.
   - Press **ENTER.**



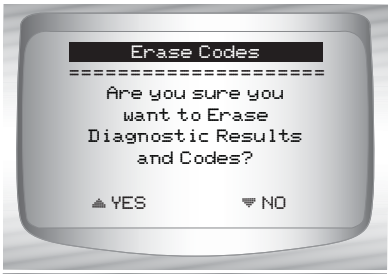
✓ If diagnostic results and codes are not to be erased select **No** and press **ENTER.**



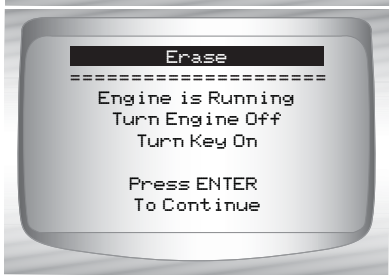
- Selecting **No** displays a ***Command Cancelled*** message prompting to press **ENTER** to return to ***OBD II Function List***.



2. **Select Yes to erase diagnostic results and codes.**
   •Press ▲ **UP**



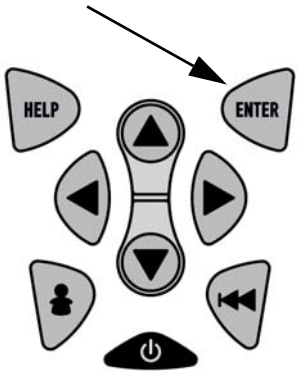
3. **Prepare Vehicle.**
   •Turn key on.
   •Leave engine off.
   •Press ENTER **ENTER**.



✓ If engine is running, tool may display this screen. Codes cannot be erased until the engine is off, key is on.

4

4. **Observe *Command Sent* message is displayed.**
   •Press ENTER **ENTER.**



5. **Return to *OBD II Function List*.**
   •Press ENTER **ENTER .**

State OBD Check (Emissions)

The ***State OBD Check*** function is used to display a basic status of the vehicles OBD system.

- ❒ Malfunction Indicator Lamp (MIL) Status
- ❒ Codes Found
- ❒ I/M Readiness

✓ The ***State OBD Check*** function has the following areas:

- ❒ MIL STATUS ON or OFF
- ❒ Number of Codes Found
- ❒ Number of Monitors OK
- ❒ Number of Monitors Inc
- ❒ Number of Monitors N/A

✓ ***State OBD Check*** should be done with the key on engine running (KOER) due to showing MIL status.

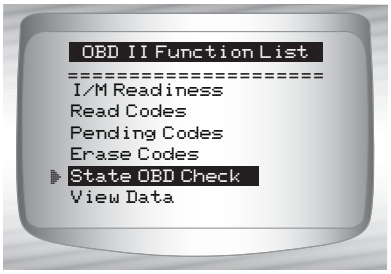
✓ The number of codes found are **only** Generic OBD II codes and **not** Pending codes.

✓ The number of Monitors that are either OK, INC or NA are **only** Since DTCs Cleared and **not** This Drive Cycle.

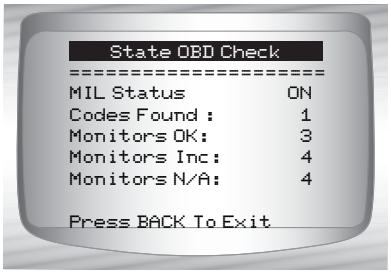
✓ Refer to ***Read Codes*** and ***I/M Monitors*** for more detailed information about the results.

From ***the OBD II Function List:***

1. **Select *State OBD Check***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***State OBD Check*** is highlighted
   - Press ENTER **ENTER .**



2. **View State OBD Check Display**



3. **Return to OBD II Function List.**
   - Press BACK **BACK**

4

View Data

The ***View Data*** function allows real time viewing of the vehicle's computer module's PID data. As the computer monitors the vehicle, information is simultaneously transmitted to scan tool.

✓ View data allows the following items to be viewed on the scan tool:

- ❒ Sensor data
- ❒ Operation of switches
- ❒ Operation of solenoids
- ❒ Operation of relays

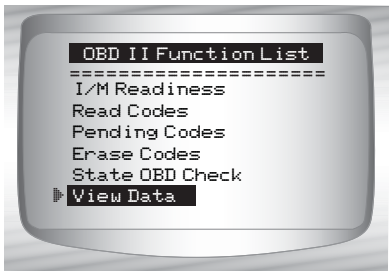
✓ View data can be shown as:

- ❒ Entire Data List
- ❒ Custom Data List

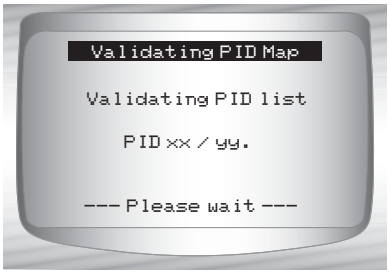
✓ Apart from ***Read Codes***, ***View Data*** is the most useful diagnostic function for isolating the cause of a vehicle operation problem.

From ***OBD II Function List***:

1. **Select *View Data.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***View Data*** is highlighted.
   - Press ENTER **ENTER.**



2. **Observe while Scan Tool validates PID MAP.**



✓ Multiple PIDs may be sent if vehicle is equipped with more than one computer module (for example a powertrain control module [PCM] and a transmission control module [TCM]). The Scan Tool identifies them by their identification names (ID) assigned by manufacturer (i.e. $10 or $1A).

✓ If one or more control module stops responding, the Scan Tool displays a message.

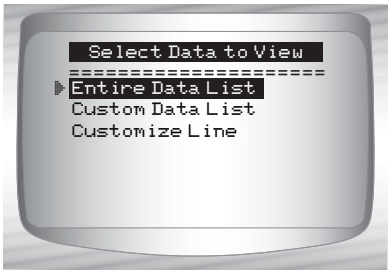
- ❒ If continuing, dashes will replace data in right hand column.
- ❒ If no is selected, then the Scan Tool attempts to re-establish communication with that module.

View Entire List.

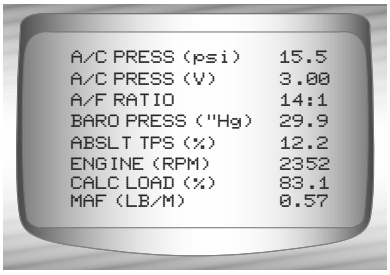
✓ ***View Entire List*** shows all supported PID data for the vehicle being tested.

From ***Select Data to View*** menu:

1. **Select *Entire Data List.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Entire Data List*** is highlighted.
   - Press **ENTER.**

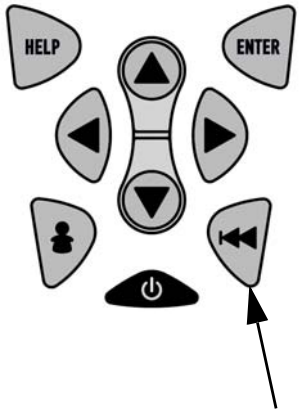


2. **View PIDs on Scan Tool.**
   - Use ▲ **UP** or ▼ **DOWN** arrow key.



3. **Return to *Select Data to View Menu.***
   - Press **BACK**.

4. **Return to *OBD II Function List.***
   - Press **BACK**.

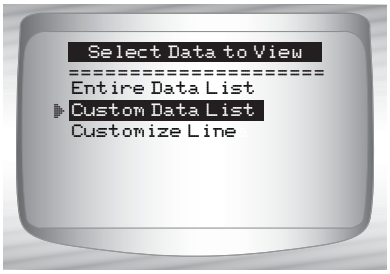


Custom List Select

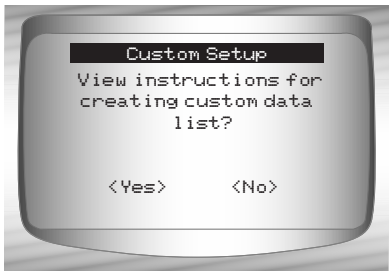
✓ The ***Custom Data List*** allows certain PIDs from the ***View Entire Data List***, such as those PIDs that apply to a specific driveability symptom or system, to be selected.

From ***Select Data to View*** menu:

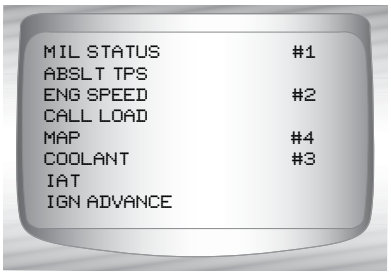
1. **Select *Custom List Select.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Custom Data List*** is highlighted.
   - Press ENTER **ENTER.**



2. **Select View Instructions or Not.**
   - Use ◄ **LEFT** or ► **RIGHT** arrow key.
   - Press ENTER **ENTER.**



3. **Select PIDs to View.**
   - Use ▲ **UP** or ▼ **DOWN** **RIGHT** arrow keys to move up and down list
   - The ► **RIGHT** arrow selects or deselects data parameter. All selected data values show the order in which they will be displayed.



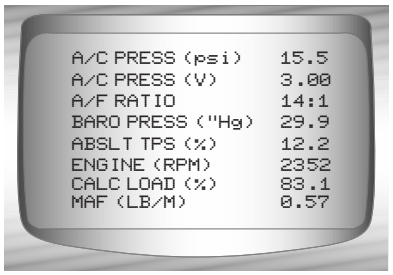
   - The ◄ **LEFT** arrow deselects all marked data parameters.
   - The ENTER **ENTER** key starts recording data, or displaying selected data parameters.

✓ Selected PIDs are kept until:

- ❒ Another vehicle is selected.
- ❒ You erase data stored in the Scan Tool from the previous vehicle tests.

4. View PIDs on Scan Tool.

•Use ▲ **UP** or ▼ **DOWN** arrow key.

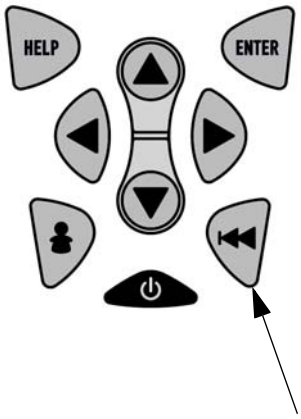


5. Return to *Select Data to View Menu.*

•Press ◄◄ **BACK**.

6. Return to *OBD II Function List.*

•Press ◄◄ **BACK**.



4

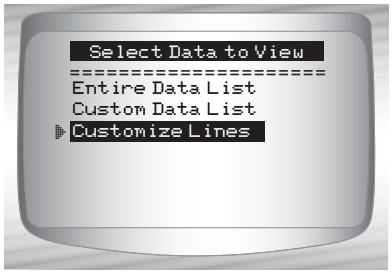
Customize Lines

✓ The ***Customize Lines*** allows the number of lines to be shown at one time to be set from 1 to 8.

✓ Selecting fewer lines provides faster update speeds. The default is a eight-line display.

From ***Select Data to View*** menu:

1. **Select *Customize Lines.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Customize Lines*** is highlighted.
   - Press ENTER **ENTER.**



2. **Select *Display Lines.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key.
   - Press ENTER **ENTER.**

View Freeze Data

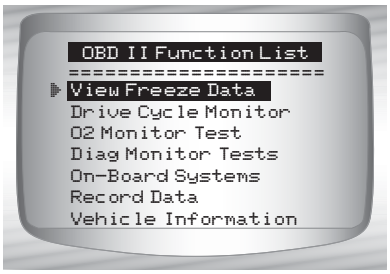
When an emission-related fault occurs, certain vehicle conditions are recorded by the on-board computer. This information is referred to as freeze frame data. ***View Freeze Data*** is a snapshot of the operating conditions at the time of an emission-related fault.

✓ ***View Freeze Data*** can be overwritten by faults with a higher priority.

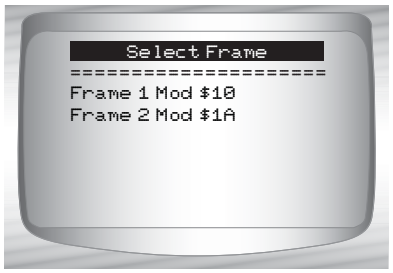
✓ If codes were erased, ***View Freeze Data*** may not be stored in vehicle memory depending on vehicle.

From ***OBD II Function List:***

1. **Select *View Freeze Data.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***View Freeze Data*** is highlighted.
   - Press **ENTER.**



2. **Select Frame (if more than 1 frame is present).**
   - Use ▲ **UP** or ▼ **DOWN** arrow key.
   - Press **ENTER.**



3. **Select another frame to view (if available)**
   - Press **BACK**.

4. **Return to *OBD II Function List.***
   - Press **BACK**.

Drive Cycle Monitor

The ***Drive Cycle Monitor*** function is very similar to the I/M Monitors though the ***Drive Cycle Monitor*** is used to view **REAL TIME** operations of the Emissions System on OBD II vehicles.

✓ ***Drive Cycle Monitor*** continuously updates as the vehicle reports operations of the Emission System.

✓ Refer to the vehicle service manual for the drive cycle operation.

✓ During normal driving conditions, the vehicle computer scans the emission system. After a specific amount of drive time (each monitor has specific driving conditions and time requirements), the computer's monitors will decide if the vehicle emissions system is working correctly or not as well as detecting out a range of values. When the monitor's status is:

- **"ok"** - vehicle has been driven enough for function.
- **"inc" (Incomplete)** - vehicle was not driven enough to complete all of the monitors.
- **"n/a" (Not Applicable)** - vehicle does not support that monitor.

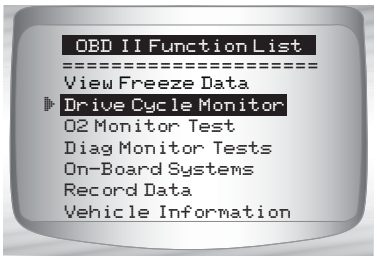
✓ **Clear Monitors by:**

❒ Erasing Codes.
❒ Vehicle Computer Module losing power (on some vehicles).

From the ***OBD II Function List:***

1. Select *Drive Cycle Monitor.*

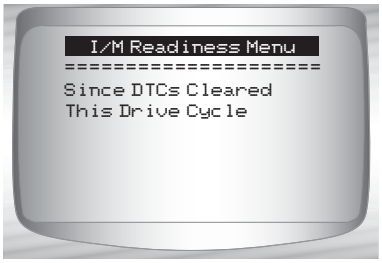
- Use ▲ **UP** or ▼ **DOWN** arrow key to highlight ***Drive Cycle Monitors***.
- Press ENTER **ENTER.**



✓ Two types of ***Drive Cycle Monitors*** are:

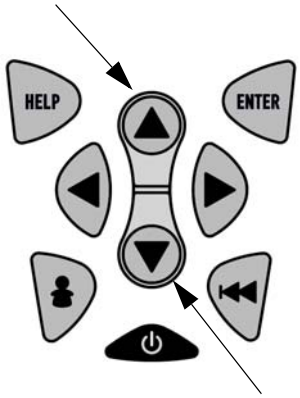
- ❒ ***SINCE DTCs CLEARED*** shows status of the monitors since the Diagnostic Trouble Codes were last erased.
- ❒ ***THIS DRIVE CYCLE*** shows status of monitors since start of current drive cycle. Refer to the vehicle service manual for more detailed information on emission-related monitors and their status.

✓ Some vehicles **DO NOT** support ***Drive Cycle Monitors***. If vehicle supports both types of ***Drive Cycle Monitors*** the Menu will display.

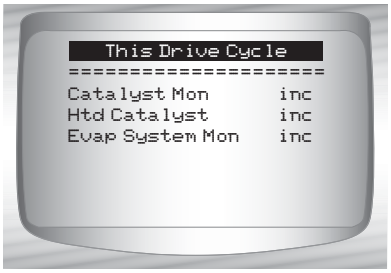


2. View Summary of Monitor Status.

- Use ▲ **UP** or ▼ **DOWN** arrow key (if required).



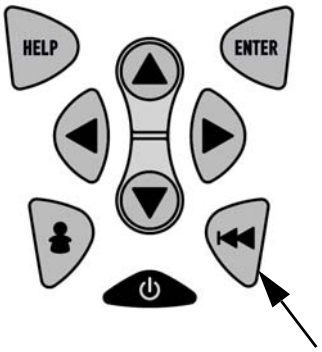
3.Depending on the ***Drive Cycle Monitors*** one of these 2 screens will be present.

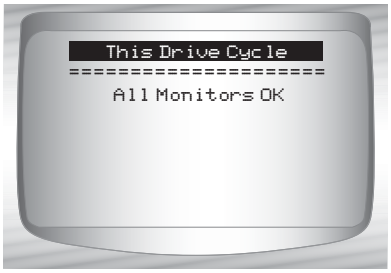


OR

✓ The Scan Tool display is continuously updated. Only the “inc” monitors are displayed. Monitors designated “n/a” or “ok” are not displayed.

✓ When all Monitors are **“OK”** the following Screen is shown.





OR

4.Return to *Previous Menu.*
Press BACK key.

O2 Monitor Test

OBD II regulations require applicable vehicles monitor and test oxygen (O2) sensors to determine problems related to fuel and emissions. The ***O2 Monitor Test*** allows retrieval of completed O2 sensors monitor test results.

✓ **The *O2 Monitor Test* is not an on-demand test.** O2 sensors are **not** tested when selected via the menu. O2 sensors are tested when engine operating conditions are within specified limits.

✓ If the vehicle communicates using a controller area network (CAN), O2 monitor tests are not supported by vehicle. A message is displayed. See ***"*Diagnostic Monitor Tests**" on page 4-25 to see O2 monitor data.

✓ O2 sensors are located before (upstream) and after (downstream) catalyst(s). Sensors are named (xy) for their position to both cylinder banks and catalysts.

- ❒ The O2 sensor for cylinder bank 1 has prefix **1**y while O2 sensor for cylinder bank 2 has prefix **2**y.
- ❒ The O2 sensor upstream of catalyst (closest to engine) has suffix x**1** while O2 sensor downstream of catalyst has suffix x**2**. If vehicle contains more catalysts, O2 sensor downstream of second catalyst has suffix x**3** and O2 sensor downstream of next catalyst has suffix x**4**.
- ❒ For example, **O2S21** is upstream O2 sensor for cylinder bank 2.

The following *O2 Sensor Tests* are available:

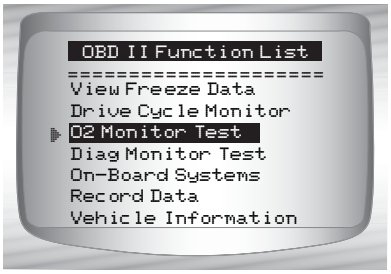
1) Rich-to-lean sensor threshold voltage
2) Lean-to-rich sensor threshold voltage
3) Low sensor voltage for switch time
4) High sensor voltage for switch time
5) Rich-to-lean sensor switch time
6) Lean-to-rich sensor switch time
7) Minimum sensor voltage test cycle
8) Maximum sensor voltage test cycle
9) Time between sensor transitions
10) Sensor period
11) Manufacturer specific tests

From the ***OBD II Function List:***

1. Select ***O2 Monitor Test.***

•Use ▲ **UP** or ▼ **DOWN** arrow key until ***O2 Monitor Test*** is highlighted.

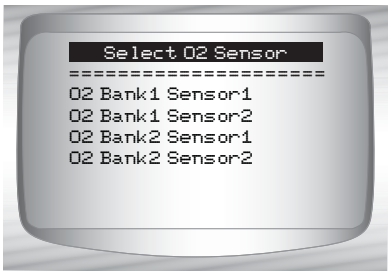
•Press ENTER **ENTER.**



2. ***Select O2 Sensor.***

•Use ▲ **UP** or ▼ **DOWN** arrow key until desired O2 Sensor is highlighted.

•Press ENTER **ENTER.**



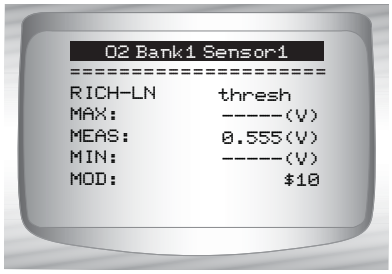
4

✓ The O2 sensors located upstream (before catalyst) may perform differently than ones located downstream (after catalyst).

✓ Test IDs are shown for unknown O2 sensor tests.

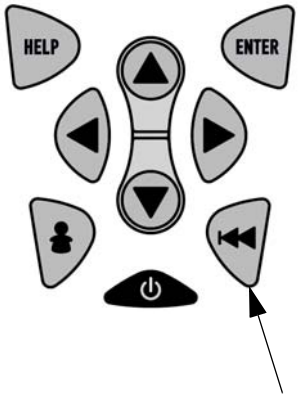
3. View Results of Selection.

•Use ▲ **UP** or ▼ **DOWN** arrow key.



4. **Return to *O2 Monitor Tests* menu.**
   •Press **BACK**.

5. **Return to *OBD II Function List.***
   •Press **BACK**.



Diagnostic Monitor Tests

The ***Diagnostic Monitor Test*** function is useful after servicing or after erasing a vehicle's memory. Test results do not necessarily indicate a faulty component or system.

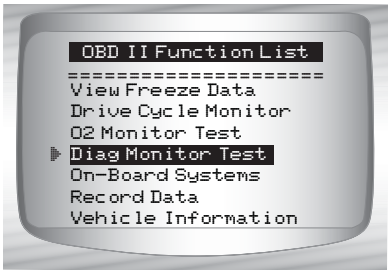
✓ *Non-CAN vehicles* ***Diagnostic Monitor Test*** receives test results for emission-related powertrain components and systems that are **not continuously monitored.**

✓ *CAN vehicles* ***Diagnostic Monitor Test*** receives test results for emission-related powertrain components and systems that **are and are not continuously monitored.**

✓ Vehicle manufacturer is responsible for assigning test and component IDs.

From the ***OBD II Function List:***

1. **Select *Diag Mon Tests.***
   •Use **UP** or **DOWN** arrow key until ***Diag Mon Tests*** is highlighted.
   •Press **ENTER.**

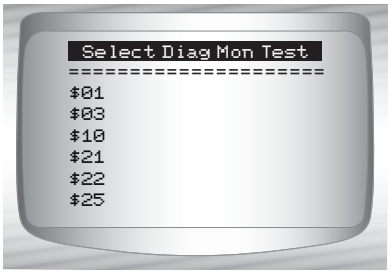


✓ Applicable ***Diagnostic Monitor Tests*** are displayed.

2. Review test results displayed on Scan Tool.

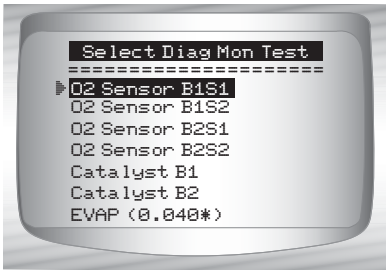
- Use ▲ **UP** or ▼ **DOWN** arrow key until desired test results is highlighted.
- Press ENTER **ENTER.**

✓ Refer to appropriate vehicle service manual for test IDs and definitions.



Non-CAN Vehicles

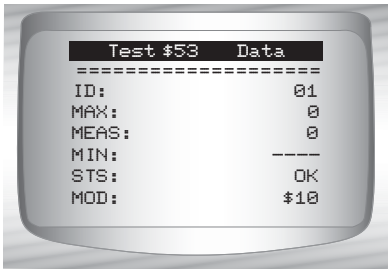
OR



CAN Vehicles

✓ On *Non-CAN vehicles* the Scan Tool displays:

- ❒ Test data (test ID)
- ❒ Maximum value (MAX)
- ❒ Test measurements (MEAS)
- ❒ Minimum value (MIN)
- ❒ Status (STS)
- ❒ Measurements and Specification values are hexadecimal numbers (i.e., $1A, $FE, $11.)
- ❒ Module (MOD)

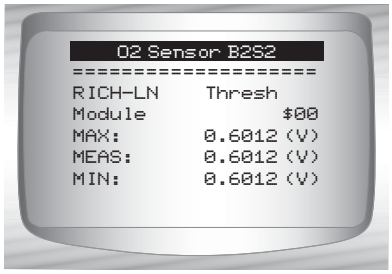


Non-CAN Vehicles

OR

✓ On *CAN vehicles* Scan Tool displays:

- ❒ Test performed. The test performed can be $## if test is not defined. Refer to vehicle service manual for details.
- ❒ Measured values and units of measure (such as volts, amps, and seconds).
- ❒ Module ID where the monitor test data came from.

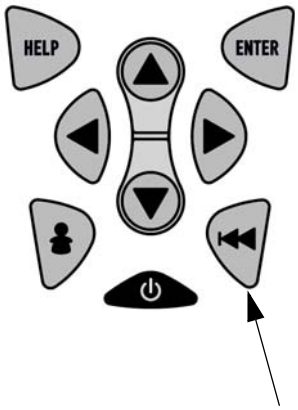


CAN Vehicles

4

3. **Return to *Select Diag Mon Test Menu.***
   •Press **BACK** key.

4. **Return to *OBD II Function List.***
   •Press **BACK** key.



On-Board Systems

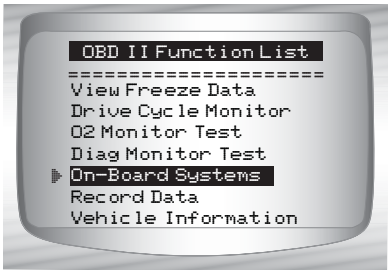
The ***On-Board Systems*** test allows the Scan Tool to control operation of vehicle components, tests or systems.

✓ Some manufacturers do not allow tools to control vehicle systems. A vehicle not supporting an on-board system is identified by a message that is displayed when selected.

✓ Refer to the vehicle service manual for on-board systems instructions.

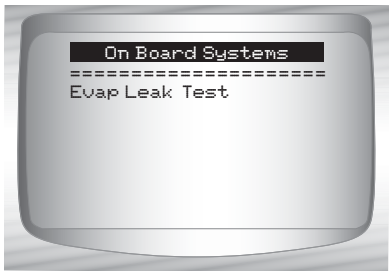
From the **OBD II Function List:**

1. **Select *On-Board Systems.***
   •Use **UP** or **DOWN** arrow key until ***On-Board Systems*** is highlighted.
   •Press **ENTER.**



✓ A list of on-board systems and components available for testing are shown on the display.

2. **Select Test.**
   •Use **UP** or **DOWN** arrow key.
   •Press **ENTER.**



3. **Return to *On-Board Systems*** menu.
   •Press **BACK** key.

4. **Return to *OBD II Function List.***
   •Press **BACK** key.

✓ The manufacturer is responsible for determining the criteria to automatically stop test. Refer to appropriate vehicle service manual.

Record Data

✓ The ***Record Data*** function records PIDs while vehicle is parked or being driven.

✓ The ***Record Data*** function is mainly used for diagnosing intermittent driveability problems that cannot be isolated by any other method.

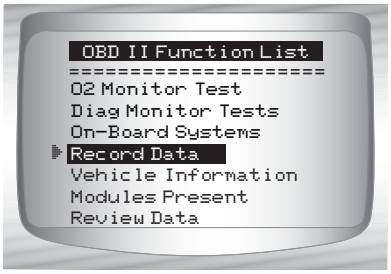
✓ The recording time varies. A recording consists of frames of data prior to the trigger and several frames after the trigger.

✓ Some vehicles wait a long period of time to store a trouble code after a driveability problem occurs. If the operator selected ***Trigger On Codes*** when making a recording, the operator might not see any drastic change in the data parameters before and after trigger point.

⚠CAUTION **Two people must be in vehicle when driving. One to drive and the other to operate the Scan Tool.**

From ***OBD II Function List***:

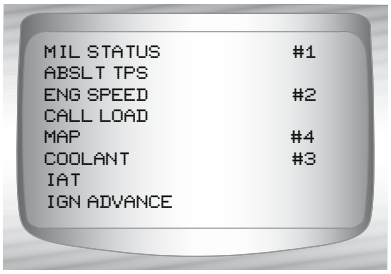
1. **Select *Record Data.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Record Data*** is highlighted.
   - Press ENTER **ENTER.**



✓ Follow all instructions on display.

✓ The ScanTool can maintain only one recording. Make sure to thoroughly review old recording before erasing.

✓ If a recording currently exists in memory, a message prompting to erase data is displayed.



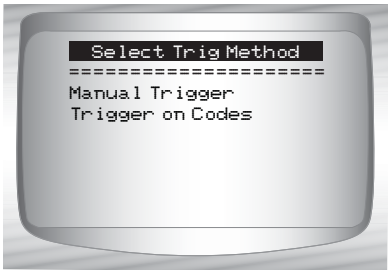
✓ Scan Tool validates list of global PIDs from vehicle.

2. **Refer to *View Data* to setup *Custom List* or *View Entire List*.**

✓ There are 2 types of trigger methods used:

- ❒ ***Manual Trigger -*** allows operator to use the ENTER **ENTER** key to start recording.
- ❒ ***Trigger On Codes -*** automatically triggers when a diagnostic trouble code (DTC) is detected by vehicle.

3. **From the *Select Trigger Method* Screen.**
   - Use ▲ **UP** or ▼ **DOWN** arrow key until desired trigger method is highlighted.
   - Press ENTER **ENTER.**



✓ When trigger event (either a DTC or a Press of the ENTER **ENTER** key) occurs, time is recorded and data is saved.

4

✓ Data continues to be saved until either:

- ❒ Record memory is full.
- ❒ Operator presses ENTER **ENTER** .

✓ Scan Tool recording times vary. A recording consists of frames of data prior to trigger and several frames after trigger.

4. **After recording, Scan Tool displays a prompt to *Playback Data*.**
   - Answer ***No*** to return to ***OBD II Function List***.
   - Answer ***Yes*** to display recorded data.
     - ❒Refer to ***Playback*** from ***Review Data*** and press **ENTER .**

Vehicle Info

The ***Vehicle Info*** function allows the Scan Tool to request the vehicle's VIN number, calibration ID(s) which identifies software version in vehicle control module(s), and calibration verification numbers (CVN(s).)

✓ ***Vehicle Info*** function applies to model year 2000 and newer OBD II compliant vehicles.

✓ The Scan Tool cannot verify if data is correct for scanned vehicles.

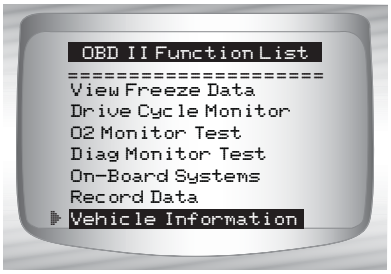
✓ CVNs are calculated values required by OBD II regulations.

✓ The CVN calculation may take several minutes.

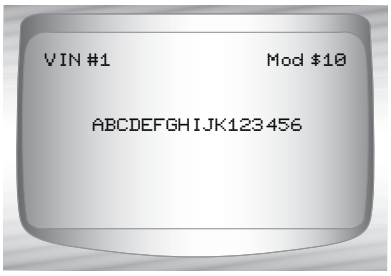
✓ CVNs are reported to determine if emission-related calibrations have been changed. Multiple CVNs may be reported for a control module.

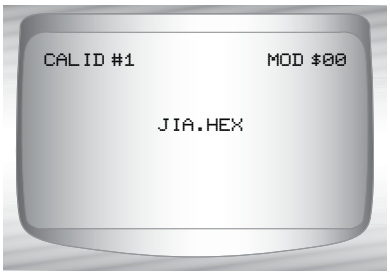
From the **OBD II Function List:**

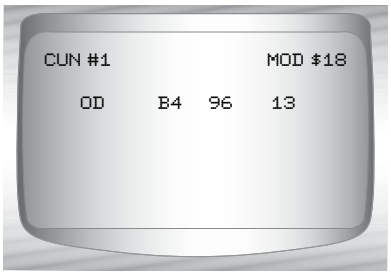
1. **Select *Vehicle Information*.**
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Vehicle Information*** is highlighted.
   - Press ENTER **ENTER.**



2. **View Information Supported by Vehicle.**
   - Use ▲ **UP** or ▼ **DOWN** arrow key (if required).







✓ In the above examples, Module $10 and $18 returned data. Scroll down to view information. CVNs are shown as hexadecimal numbers.

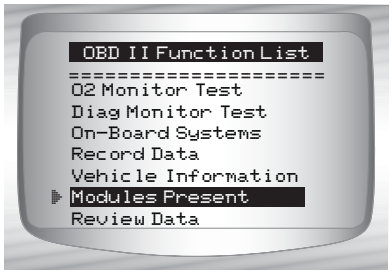
3. **Return to *OBD II Function List:***
   - Press ◀◀ **BACK** or ENTER **ENTER** key.

Modules Present

The Scan Tool identifies the module IDs and communication type for OBD II modules in the vehicle.

From the **OBD II Function List:**

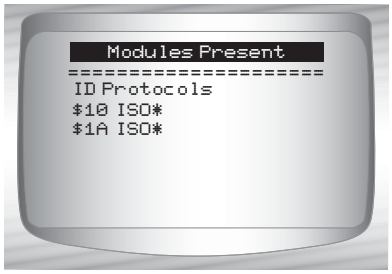
1. **Select *Modules Present.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Modules Present*** is highlighted.
   - Press ENTER **ENTER.**



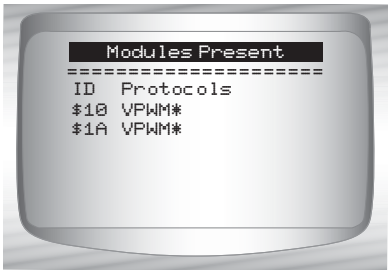
4

✓ The types of protocols (communication types) supported by the Scan Tool are:

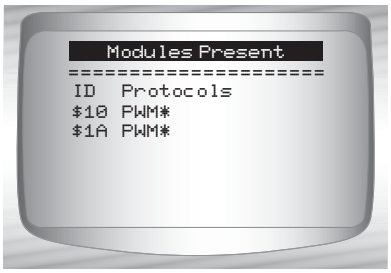
❒ ISO 9141-2 protocol is shown as ISO.



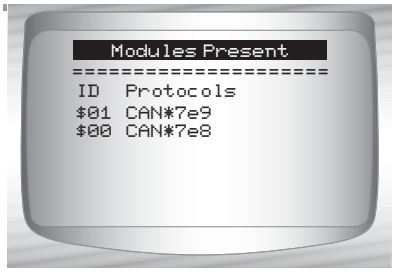
❒ SAE J1850 protocol is shown as VPWM or PWM.



OR

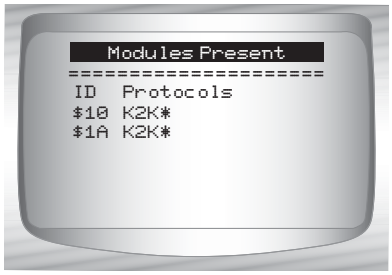


❒ ISO 15765-4 protocol is shown as CAN.



✓ Since CAN vehicles use module IDs larger than 2 digits, the Scan Tool assigns a 2 digit module ID to be used in place of the actual CAN module ID. The module ID assigned for the CAN module ID is used in all functions of the Scan Tool.

•ISO 14230-4 protocol is shown as K2K (Keyword 2000.)



✓ In the above examples the * indicates the protocol used to communicate to the vehicle's control module.

Section 5 – Troubleshooting

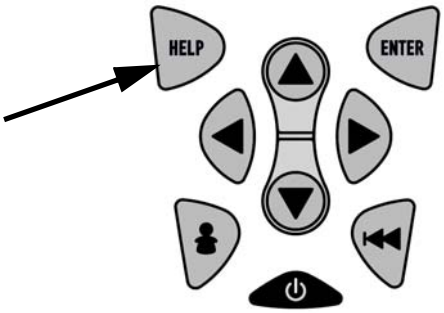
How to Use On-Line Help

Scan tool contains On-Line Help for specific Scan Tool screens, functions, and error messages.

✓ When icon (?) appears in the right column of the display, On-Line Help is available.

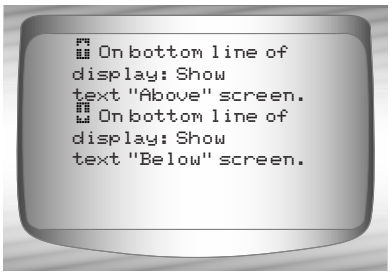
To Use **On-Line Help**:

1.Press HELP Key.



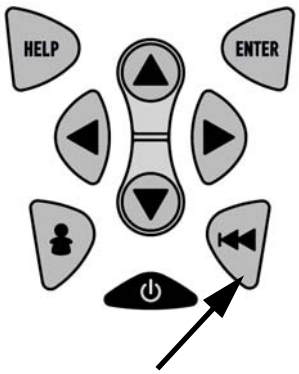
✓ Notice Text:

❒ Use **UP** or **DOWN** arrow key if required.



2. Return to original screen.

• Press **BACK** key.



8

Error Messages

Check the following if an error message displays:

- ❒ Verify ignition key is in the ON and not in the ACCESSORIES position.
- ❒ Make sure OBD II Cable is attached to vehicle's data link connector (DLC) and Scan Tool.
- ❒ Look at DLC and check for cracked or recessed pins, or for any substance that could prevent a good electrical connection.
- ❒ Test for continuity between the DLC wiring and the computer. In an extreme case, there may be a broken wire.
- ❒ Check for bent or broken pins.
- ❒ With the key on engine off (KOEO), check for blown fuses.
- ❒ Make sure the vehicle's control module has a good ground. If the computer case is grounded, then clean the connection and apply a conductive (dielectric) grease to the mating surfaces.
- ❒ With the KOEO, verify battery voltage is at least 8.0V
- ❒ Verify the control module is not defective. Refer to the service manual to diagnose the control module.

Scan Tool Does Not Power Up

✓ Review **Safety Precautions** before troubleshooting.

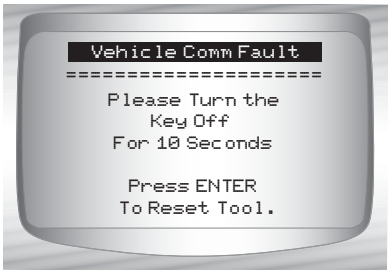
If Scan Tool will not power up, communicate with vehicle's control module, pass Scan Tool self-tests, or functions incorrectly in any other way, do the following:

- ❒ Check and replace the 9V battery if needed.
- ❒ Clean the DLC pins.
- ❒ Disconnect and reconnect DLC making sure it is connected correctly.
- ❒ Check vehicle battery to make sure at least 8.0 volts is present.
- ❒ Contact customer service.

Vehicle Communication Fault

The vehicle's control module(s) enters into an unrecoverable state.

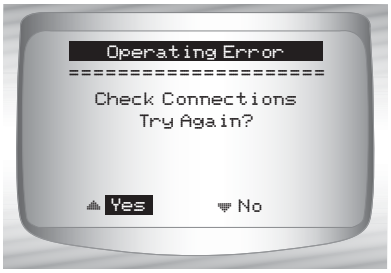
1. **Turn vehicle key to off position.**
   - Wait 10 seconds.
   - Press **ENTER**.



Operating Error or Erroneous Data.

An **Operating Error** or **Erroneous Data** occurs if vehicle's computer(s) stop(s) communicating with Scan Tool.

1. **Make Selection**
   - Use **UP** or **DOWN** arrow key.
   - Press **ENTER**.



8

✓ See **"Error Messages"** on page 5-2 for possible causes.

Battery Replacement

The Scan Tool requires 9V alkaline battery to operate without vehicle power.

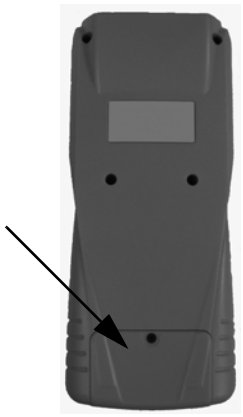
✓ When the battery needs to be replaced, the low-battery icon ( ) displays.

✓ Rechargeable batteries do not last as long as alkaline types and are not recommended.

✓ Non-rechargeable Lithium (Li) battery can be used. Though Lithium types last longer than the alkaline types, and they are more expensive.

1. Place Display Face Down.
- On non-abrasive surface.

2. Remove Battery Cover.
- Turning phillips screw counterclockwise.
- Slide battery cover off.



3. Remove Battery and Properly Discard.

4. Install New Battery.
- 9V Alkaline Battery.

5. Reinstall Battery Cover.
- Slide battery cover on.
- Install phillips screw turning it clockwise.
- Do not overtighten screw.

Tool Self-Tests

Tool Self-Tests check the display, keys, and internal memory.

✓ Refer to **Using The Scan Tool** section of the manual for the operation procedures for Scan Tool self-tests.

Technical Support

- Toll-Free Number: **1-800-228-7667**.
- Website: www.actron.com

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Appendix A – PID Definitions

Global PID Definitions

All global parameter identification (PID) data listed were verified on actual vehicles to guarantee accuracy. PID definitions were obtained from reliable sources and are accurate at time of printing. It is possible that some newer vehicles may contain data different from what is listed. Always refer to vehicle service manual for manufacturer specific PIDs.

Remember, always refer the applicable service manual for detailed diagnostic procedures when troubleshooting PID values.

Types of Data Parameters

INPUT: These data parameters are obtained from sensor circuit outputs. Sensor circuit outputs are inputs to the vehicles PCM. For example, if oxygen sensor circuit was generating a 400mV signal, then the code reader would read O2S (v).40.

OUTPUT: These data parameters are outputs or commands that come directly from control module(s). For example, the ignition spark advance is controlled by PCM, on most vehicles, monitoring this PID shows spark output from PCM.

CALCULATED VALUE: These data parameters are calculated after analyzing various inputs to the vehicles control module(s). For example, the engine load. The PCM calculates this from sensor inputs and displays in a percentage.

PCM VALUE: Information that is stored in the control module(s) memory and determined to be useful to service technician. An example of this is TROUBLE CODE values, the DTC that caused a freeze frame capture.

NOTE: Several different causes can have the same parameter indication. For information on diagnostics consult applicable service manuals.

NOTE: The Scan Tool **only** displays the PID's the vehicle supports.

Global Data Parameter List:

ABS FRP
Absolute Fuel Rail Pressure

ABS LOAD
Absolute Load Value

ABSLT TPS
Absolute Throttle Position

ACC POS x
Accelerator Position x

BARO PRS
Barometric Pressure

CALC LOAD
Calculated Engine Load

CAT TEMP xy
Cataltic Converter Temperature Bank x, Sensor y

CLR DST
Distance Since Codes Cleared

CLR TIM
Time Since Clear Code

CMD EQ RAT
Commanded Equivalence Ratio

COOLANT
Engine Coolant

EGR CMD
Commanded Exhaust Gas Recirculation

EGR ERR
Exhaust Gas Recirculation Error

ENG RUN
Engine Run Time

ENGINE
Engine Speed

EQ RAT
Oxygen Sensor Equivalence Ratio

EVAP REQ
Commanded Evaporative Emission System Purge (0-100%)

EVAP VP
Evaporative Emission System Vapor Pressure

FUEL LVL
Fuel Level

FUEL PRES
Fuel System Pressure

FUEL SYS x
Fuel System x Loop Status

IAT
Intake Air Temperature

IGN ADV
Ignition Advance

LT FTRM x
Bank x Long Term Air To Fuel Ratio Correction Factor

MAF
Mass Air Flow Sensor

MAP
Manifold Absolute Pressure

MIL DIST
Distance Since Malfunction Indicator Lamp Came On

MIL STATUS
Malfunction Indicator Lamp Light Status

MIL TIM
Distance Travelled Or Time Since Malfunction Indicator Lamp Was Activated

O2S
O2 Sensor Output

OBD2 STAT
On Board Diagnostics 2 System Type

OUTSID AIR
Outside Air Temperature

PTO STATUS
Power Take Off Status

REL FRP
Relative Fuel Rail Pressure or Vacuum

REL TPS
Relative Or Learned Throttle Position

SECOND AIR
Secondary Air Pump Status

ST FTRM
Short Term Fuel Trim

ST FTRM x
Short Term Fuel Trim Bank x
THR POS x
Throttle Position x
THROT CMD
Throttle Actuator Commanded
TRIPS SNC CLR
Warmups Since Erase Codes
TROUB CODE
Diagnostic Trouble Code That Set Freeze Frame
VEH SPEED
Vehicle Speed
VPWR
Vehicle Power

A

Appendix B – Glossary

A/C:
Air Conditioner

A/D:
Analog to Digital

A/F:
Air/Fuel ratio. The proportion of air and fuel delivered to the cylinder for combustion. For example, an A/F ratio of 14:1 denotes 14 times as much air as fuel in the mixture. Ideally the A/F ratio is 14.7:1.

ABS:
Anti-lock Brake System

A/C Clutch Relay:
The PCM uses this relay to energize the A/C clutch, turning the A/C compressor on or off.

A/C Pressure Sensor:
Measures air conditioning refrigerant pressure and sends a voltage signal to the PCM.

A/C Pressure Switch:
A mechanical switch connected to the A/C refrigerant line. The switch is activated (sending a signal to the PCM) when the A/C refrigerant pressure becomes too low or high.

Actuator:
Actuators such as relays, solenoids, and motors allow the PCM to control the operation of vehicle systems.

Air Injection Reaction (AIR) System:
An emission control system operated by the PCM. During cold starts, an air pump injects outside air into the exhaust manifold to help burn hot exhaust gases. This reduces pollution and speeds warm-up of oxygen sensors and catalytic converters. After the engine is warm, the air will either be dumped back to the atmosphere (or into the air cleaner assembly) or sent to the catalytic converter.

APP:
Acceleration Pedal Position (Sensor)

ASR:
Acceleration Slip Regulation

Bank x:
The standard way of referring to the bank of cylinders containing cylinder #x. In-line engines have only one bank of cylinders. Most commonly used to identify the location of oxygen sensors. See **O2S**, **Sensor x**, **Sensor x**.

BARO:
Barometric Pressure Sensor. See **MAP Sensor**.

BBV:
Brake Boost Vacuum (Sensor)

BCM:
Body Control Module

Boost Control Solenoid:
A solenoid that is energized by the PCM, in order to control turbo/supercharger boost pressure.

Brake Switch Signal:
An input signal to the PCM indicating that the brake pedal is being pressed. This signal is typically used to disengage Cruise Control systems and Torque Converter Clutch (TCC) solenoids. See also **TCC**.

CAM:
Camshaft Position Sensor. Sends a frequency signal to the PCM in order to synchronize fuel injector and spark plug firing.

Catalytic Converter:
Designed to reduce exhaust emissions.

CAN:
Controller Area Network

CARB:
California Air Resources Board. Governing body for emissions control in California.

CKP REF:
Crankshaft Position Reference.

CKP:
Crankshaft Position. See **CPS**.

CKT:
Circuit

Closed Loop (CL):
A feedback system that uses the O2 Sensor(s) to monitor the results of combustion. Based on the signal(s) from the O2 sensor(s), the PCM modifies the air/fuel mixture to maintain optimum performance with lowest emissions. In closed loop mode, the PCM can fine tune control of a system to achieve an exact result.

CMP:
Camshaft Position Sensor

CO:
Carbon Monoxide; odorless gas produced by incomplete combustion.

Code Scanner:
A device that interfaces with and communicates information via a data link.

Continuous Memory Codes:
See **Pending Codes**.

B

CPS:
Crankshaft Position Sensor. Sends a frequency signal to the PCM. It is used to reference fuel injector operation and synchronize spark plug firing on distributorless ignition systems (DIS).

CTS:
Coolant Temperature Sensor. A resistance sensor that sends a voltage signal to the PCM indicating the temperature of the coolant. This signal tells the PCM whether the engine is cold or warm.

CVRTD:
Continuous Variable Real Time Damping

D/R:
Drive/Reverse

Data Link Connector (DLC):
Connector providing access and/or control of the vehicle information, operating conditions, and diagnostic information. Vehicles with OBD II use a 16-pin connector located in the passenger compartment.

Data Stream:
The actual data communications sent from the vehicle's PCM to the data connector.

DEPS:
Digital Engine Position Sensor.

Detonation:
See **Knock**.

DI/DIS:
Direct Ignition/Distributorless Ignition System. A system that produces the ignition spark without the use of a distributor.

DPFE:
Differential Pressure Feedback – Exhaust Gas Recirculation Sensor

DTC:
Diagnostic Trouble Code. An alphanumeric identifier for a fault condition identified by the On Board Diagnostic System.

Duty Cycle:
A term applied to signals that switch between on and off. Duty cycle is the percentage of time the signal is on. For example, if the signal is on only one fourth of the time, then the duty cycle is 25%. The PCM uses duty cycle type signals to maintain precise control of an actuator.

EBCM:
Electronic Brake Control Module

EBTCM:
Electronic Brake/Traction Control Module

ECM
Engine Control Module *or* Electronic Control Module

ECT:
Engine Coolant Temperature sensor. See **CTS**.

EEPROM:
Electrically Erasable Programmable Read Only Memory

EFE:
Early Fuel Evaporation

EFI:
Electronic Fuel Injection. Any system where a computer controls fuel delivery to the engine by using fuel injectors.

EGR:
Exhaust Gas Recirculation. The PCM uses the EGR system to recirculate exhaust gases back into the intake manifold to reduce emissions. EGR is used only during warm engine cruise conditions.

EOP:
Engine Oil Pressure (Switch)

EOT
Engine Oil Temperature (Sensor)

EPA:
Environmental Protection Agency.

ESC:
Electronic Spark Control. An ignition system function that warns the PCM when knock is detected. The PCM then retards spark timing to eliminate the knocking condition.

EST:
Electronic Spark Timing. An ignition system that allows the PCM to control spark advance timing. The PCM determines optimum spark timing from sensor information — engine speed, throttle position, coolant temperature, engine load, vehicle speed, Park/Neutral switch position, and knock sensor condition.

EVAP:
Evaporative Emissions System.

FC:
Fan Control

Freeze Frame:
A block of memory containing DTCs of the vehicle operating conditions for a specific time.

FTP:
Federal Test Procedure. Strict test of vehicle's emissions.

Ground (GND):
An electrical conductor used as a common return for an electric circuit(s) and with a relative zero potential (voltage).

Hall Effect Sensor:
Any of a type of sensor utilizing a permanent magnet and a transistorized Hall Effect switch. Hall Effect type sensors may be used to measure speed and position of the crankshaft or camshaft — for spark timing and fuel injector control.

HO2S:
Heated Oxygen Sensor. See **O2S**.

HVAC:
Heating, Ventilation & Air Conditioning (System)

I/M:
Inspection and Maintenance. An emission control program.

IAC:
Idle Air Control. A device mounted on the throttle body which adjusts the amount of air bypassing a closed throttle so that the PCM can control idle speed.

IAT:
Intake Air Temperature (Sensor)

ICM:
Ignition Control Module.

IMRC:
Intake Manifold Runner Control

IPC:
Instrument Panel Cluster

ISC:
Idle Speed Control. A small electric motor mounted on the throttle body and controlled by the PCM. The PCM can control idle speed by commanding the ISC to adjust its position.

ISO:
International Organization of Standardization also know as International Standards Organization.

KAM:
Keep Alive Memory

Knock Sensor (KS):
Used to detect engine detonation or knock. The sensor contains a piezoelectric element and is threaded into the engine block. Special construction makes the element sensitive only to engine vibrations associated with detonation.

Knock:
Uncontrolled ignition of the air/fuel mixture in the cylinder. Also referred to as detonation or ping. Knock indicates extreme cylinder pressures or “hotspots” which are causing the air/fuel mixture to detonate prematurely.

KOEO:
Key On Engine Off. Turn the ignition key to on, but don’t start engine.

KOER:
Key On Engine Running. Start the vehicle.

LCD:
Liquid Crystal Display

LTFT:
Long Term Fuel Trim

M/T:
Manual transmission or manual transaxle.

MAF:
Mass Air Flow (sensor). Measures the amount and density of air entering the engine and sends a frequency or voltage signal to the PCM. The PCM uses this signal in its fuel delivery calculations.

MAP:
Manifold Absolute Pressure (sensor). Measures intake manifold vacuum or pressure and sends a frequency or voltage signal (depending on sensor type) to the PCM. This gives the PCM information on engine load for control of fuel delivery, spark advance, and EGR flow.

MAT:
Manifold Air Temperature (sensor). A resistance sensor in the intake manifold that sends a voltage signal to the PCM indicating the temperature of the incoming air. The PCM uses this signal for fuel delivery calculations.

MIL:
Malfunction Indicator Lamp. The MIL is most commonly known as the Check Engine or Service Engine Soon light. A required on-board indicator to alert the driver of an emission-related malfunction.

Misfire:
Caused by the air fuel ratio being incorrect.

Monitor:
A test performed by the on-board computer to verify proper operation of emission-related systems or components.

MPFI or MFI:
Multi-Port Fuel Injection. MPFI is a fuel injection system using one (or more) injector(s) for each cylinder. The injectors are mounted in the intake manifold, and fired in groups rather than individually.

NOx:
Oxides of Nitrogen. The system EGR and Camshafts injects exhaust gases into the intake manifold to reduce these gases at the tailpipe.

O2S:
Oxygen Sensor. Generates a voltage of 0.6 to 1.1 volts when the exhaust gas is rich (low oxygen content). The voltage changes to 0.4 volts or less when the exhaust gas is lean (high oxygen content). This sensor only operates after it reaches a temperature of approximately 349ºC (660ºF). O2 sensors are usually found both upstream and downstream of the catalytic converter. The PCM uses these sensors to fine tune the air-fuel ratio and to monitor the efficiency of the catalytic converter. See **Bank 1**, **Bank 2**, **Sensor 1**, **Sensor 2**.

OBD II:
On-Board Diagnostics, Second Generation. OBD II is a U.S. Government-mandated standard requiring all cars and light trucks to have a common data connector, connector location, communication protocol, DTCs and code definitions. OBD II first appeared on vehicles in late 1994, and is required to be present on all cars sold in the US after January 1, 1996.

ODM:
Output Device Monitor.

Open Loop (OL):
A control system mode that does not monitor the output to verify if the desired results were achieved. A fuel delivery system usually operates in open loop mode during cold engine warm-up because the oxygen sensors are not yet ready to send a signal. Without the oxygen sensor signal, the computer cannot check the actual results of combustion.

PCM:
Powertrain Control Module. The brains of the engine and transmission control systems housed in a metal box with a number of sensors and actuators connected via a wiring harness. Its job is to control fuel delivery, idle speed, spark advance timing, and emission systems. The PCM receives information from sensors, then energizes various actuators to control the engine. The PCM is also known as the ECM (Engine Control Module).

Pending Codes:
Also referred to as Continuous Memory codes and Maturing Diagnostic Trouble Codes. Pending Codes may be set by emission related powertrain components and systems. If the fault does not occur after a certain number of drive cycles, the code is erased from memory.

PID:
Parameter Identification. Identifies an address in memory which contains vehicle operating information.

PNP:
Park/Neutral Position. A switch that tells the PCM when the gear shift lever is in the Park or Neutral position. When in Park or Neutral, the PCM operates the engine in an idle mode.

PROM:
Programmable Read-Only Memory. The PROM contains programming information the PCM needs to operate a specific vehicle model/engine combination.

PSPS:
Power Steering Pressure Switch

Purge Solenoid:
Controls the flow of fuel vapors from the carbon canister to the intake manifold. The canister collects vapors evaporating from the fuel tank, preventing them from escaping to the atmosphere and causing pollution. During warm engine cruise conditions, the PCM energizes the Purge Solenoid so the trapped vapors are drawn into the engine and burned.

PWM:
Pulse Width Modulated

PZM:
Platform Zone Module

QDM:
Quad Driver Module

RAM:
Random Access Memory

Relay:
An electromechanical device in which connections in one circuit are switched.

Reluctance Sensor:
A type of sensor typically used to measure crankshaft or camshaft speed and/or position, driveshaft speed, and wheel speed.

ROM:
Read-Only Memory. Permanent programming information stored inside the PCM, containing the information the PCM needs to operate a specific vehicle model/engine combination.

RPM:
Revolutions Per Minute

SAE:
Society of Automotive Engineers.

Scan Tool:
A device that interfaces with and communicates information on a data link.

SDM:
Sensing and Diagnostic Module

Sensor x:
A standard term used to identify the location of oxygen sensors. Sensor 1 is located upstream of the catalytic converter. See **O2S**, **Bank 1**, **Bank 2**.

Sensor:
Any device that reports information to the PCM. The job of the sensor is to convert a parameter such as engine temperature into an electrical signal that the PCM can understand.

SFI or SEFI:
Sequential Fuel Injection or Sequential Electronic Fuel Injection. A fuel injection system that uses one or more injectors for each cylinder. The injectors are mounted in the intake manifold and are fired individually.

Solenoid:
A device consisting of an electrical coil which when energized, produces a magnetic field in a plunger, which is pulled to a central position. A solenoid may be used as an actuator in a valve or switch.

STFT:
Short Term Fuel Trim.

STS:
Service Throttle Soon

TAC:
Throttle Actuator Control

TBI:
Throttle Body Injection. A fuel injection system having one or more injectors mounted in a centrally located throttle body, as opposed to positioning the injectors close to an intake valve port. TBI is also called Central Fuel Injection (CFI) in some vehicles.

TCC:
Torque Converter Clutch

TCM:
Transmission Control Module

TCS:
Traction Control System for PCM and brakes

TDC:
Top Dead Center. When a piston is at its uppermost position in the cylinder.

TFP:
Transmission Fluid Pressure

TFT:
Transmission Fluid Temperature (Sensor)

Throttle Body:
A device which performs the same function as a carburetor in a fuel injection system. On a throttle body injection (TBI) system, the throttle body is both the air door and the location of the fuel injectors. On port fuel injection systems (PFI, MPFI, SFI, etc.), the throttle body is simply an air door. Fuel is not added until the injectors at each intake port are activated. In each case, the throttle body is attached to the accelerator pedal.

TPS:
Throttle Position Sensor. Potentiometer-type sensor connected to the throttle shaft. Its voltage signal output increases as the throttle is opened. The PCM uses this signal to control many systems such as idle speed, spark advance, fuel delivery, etc.

Traction Assist:

Assist in traction with brakes only.

Trip:

Vehicle operation for a period of time so the systems can be monitored.

TTS:
Transmission Temperature Sensor. A resistance sensor mounted in the transmission housing in contact with the transmission fluid. It sends a voltage signal to the PCM indicating the temperature of the transmission.

VECI:
Vehicle Emission Control Information. A decal located in the engine compartment containing information about the emission control systems found on the vehicle. The VECI is the authoritative source for determining whether a vehicle is OBD II compliant.

VIN:
Vehicle Identification Number. This is the factory-assigned vehicle serial number. This number is stamped on a number of locations throughout the vehicle, but the most prominent location is on top of the dashboard on the driver's side, visible from outside the car. The VIN includes information about the car, including where it was built, body and engine codes, options, and a sequential build number.

VSS:
Vehicle Speed Sensor. Sends a frequency signal to the PCM. The frequency increases as the vehicle moves faster to give the PCM vehicle speed information used to determine shift points, engine load, and cruise control functions.

VTD:
Vehicle Theft Deterrent

Warm-up Cycle:
Warm-up cycle is when the engine coolant temperature rises at least 40 degrees above that at engine start up.

WOT:
Wide-Open Throttle. The vehicle operating condition brought about when the throttle is completely (or nearly) open. The PCM typically delivers extra fuel to the engine and de-energizes the A/C compressor at this time for acceleration purposes. The PCM uses a switch or the TPS to identify the WOT condition.

SPX Corporation Limited Warranty

THIS WARRANTY IS EXPRESSLY LIMITED TO ORIGINAL RETAIL BUYERS OF SPX ELECTRONIC DIAGNOSTIC TOOLS ("UNITS").

SPX Units are warranted against defects in materials and workmanship for one year (12 months) from date of delivery. This warranty does not cover any Unit that has been abused, altered, used for a purpose other than that for which it was intended, or used in a manner inconsistent with instructions regarding use. The sole and exclusive remedy for any Unit found to be defective is repair or replacement, the option of SPX. In no event shall SPX be liable for any direct, indirect, special, incidental or consequential damages (including lost profit) whether based on warranty, contract, tort or any other legal theory. The existence of a defect shall be determined by SPX in accordance with procedures established by SPX. No one is authorized to make any statement or representation altering the terms of this warranty.

DISCLAIMER

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SOFTWARE

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ORDER INFORMATION

Order replacement and optional parts directly from your SPX authorized tool supplier. Include the quantity, part number, and item description.

Technical Service

If you have any questions about the operation of the product, call (800) 228-7667.

Repair

When sending your SPX electronic product in for repair, include the following:

- contact name
- telephone number
- description of the problem
- proof-of-purchase for warranty repairs
- preferred method of payment for non-warranty repairs

For non-warranty repairs, please call Tech Support at (800) 228-7667. You will be advised of the cost of repair and any freight charges.

Send the unit to:

SPX Service Solutions
15825 Industrial Parkway
Cleveland Ohio 44135
Attn.: Repair

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